

VOLUME TWENTY-ONE

THE AMERICAN JOURNAL
OF PHARMACEUTICAL EDUCATION

W I N T E R

THE OFFICIAL PUBLICATION OF
THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

NINETEEN HUNDRED FIFTY-SEVEN

**THE FIFTY-EIGHTH ANNUAL MEETING OF THE
AMERICAN ASSOCIATION OF COLLEGES OF
PHARMACY WILL BE HELD APRIL 28, 29, 30, 1957
STATLER HOTEL, NEW YORK CITY.**

Association officers, committee chairmen, and speakers at the Teachers' Conference should note the Instructions to Authors in the announcement section of this issue.

THE AMERICAN JOURNAL of PHARMACEUTICAL EDUCATION

VOLUME 21

WINTER, 1957

NUMBER 1

MELVIN R. GIBSON
EDITOR

RUFUS A. LYMAN
CONSULTING EDITOR

GEORGE L. WEBSTER,
BUSINESS MANAGER

PUBLICATION COMMITTEE

LOUIS C. ZOPF, CHAIRMAN, EXECUTIVE COMMITTEE, AACP
STATE UNIVERSITY OF IOWA

GEORGE L. WEBSTER, SECRETARY-TREASURER, AACP
UNIVERSITY OF ILLINOIS

MELVIN R. GIBSON, EDITOR
STATE COLLEGE OF WASHINGTON

Published quarterly by the American Association of Colleges of Pharmacy, partially supported by the American Foundation for Pharmaceutical Education, and printed by the State College of Washington Press at the State College of Washington, Pullman, Washington. Subscription price \$4.00. Single copies \$1.00. Reentered as second class matter February 15, 1956, at the post office at Pullman, Washington, under the act of August 24, 1912.

Editorial office: School of Pharmacy, State College of Washington, Pullman, Washington. Address all communications concerning manuscripts to the Editor. Instructions to authors will be found in the announcement section of each Winter issue. Business office: College of Pharmacy, University of Illinois, 833 South Wood Street, Chicago 12, Illinois. Address all subscriptions and other business communications to the Business Manager. All new subscriptions begin with the Winter issue. The Journal assumes no responsibility for statements made by authors.

AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY -- 1956-1957

OFFICERS

HAROLD G. HEWITT, PRESIDENT UNIVERSITY OF CONNECTICUT
THOMAS D. ROWE, VICE PRESIDENT UNIVERSITY OF MICHIGAN
GEORGE L. WEBSTER, SECRETARY-TREASURER UNIVERSITY OF ILLINOIS
LOUIS C. ZOPF, CHAIRMAN, EXECUTIVE COMMITTEE STATE UNIVERSITY OF IOWA

EXECUTIVE COMMITTEE *

LOUIS C. ZOPF, 1957, CHAIRMAN STATE UNIVERSITY OF IOWA
CHARLES W. BLIVEN, 1957 GEORGE WASHINGTON UNIVERSITY
JACK E. ORR, 1957 UNIVERSITY OF WASHINGTON
LOYD E. HARRIS, 1958 OHIO STATE UNIVERSITY
JOSEPH B. SPROWLS, 1958 TEMPLE UNIVERSITY
LINWOOD F. TICE, PAST PRESIDENT PHILADELPHIA COLLEGE OF PHARMACY
AND SCIENCE
HAROLD G. HEWITT, PRESIDENT UNIVERSITY OF CONNECTICUT
THOMAS D. ROWE, VICE PRESIDENT UNIVERSITY OF MICHIGAN
GEORGE L. WEBSTER, SECRETARY-TREASURER UNIVERSITY OF ILLINOIS

HONORARY MEMBERS

ZADA M. COOPER VILLISCA, IOWA
RUFUS A. LYMAN 1649 SOUTH 21ST, LINCOLN, NEBRASKA

* Specification of a year after the name of a member of the Executive Committee indicates the year in which the term of office terminates at the time of the annual meeting.

CONTENTS

FEATURE SECTION

What is Wrong with Pharmaceutical Education? <i>A. N. Jorgensen</i>	1
What's Dangerous to Pharmaceutical Education, <i>R. A. Lyman, Jr.</i>	4
Pharmacy and Pharmaceutical Education, <i>N. H. Meyer</i>	6
A Letter from Dr. Ernest Little, <i>Ernest Little</i>	9

ARTICLES

Problems Encountered in Revision of a Pharmacy Act, <i>Tom D. Rowe</i>	10
A Survey of Refresher Programs Offered the Pharmacist by Colleges of Pharmacy, <i>Arthur G. Zupko</i>	16
Teaching Arithmetical Concepts, <i>James A. Kearns</i>	20
Some Experiences with Preparations, Technology and Physical Pharmacy in an Integrated Course, <i>Arnold D. Marcus</i>	27
Chemistry in the Five Year Program—the Graduate Program, <i>George Hager</i>	31
Integration of Basic Pharmacy Courses, <i>Joseph B. Sprowls</i>	35
Instrumental Methods of Analysis, <i>Nathan Lindley Michener</i>	38
Graduate Study in Member Colleges for 1957-1958 and Graduate Enrollment, September 1956, <i>Richard A. Deno</i>	42
Report of the Representative to the National Association of Retail Druggists, <i>Richard A. Deno</i>	45
Remington Honor Medal Citation for Frank W. Moudry, <i>Hugo H. Schaefer</i>	46
Report of the Commercial Auditors, <i>Icerman, Johnson & Hoffman</i>	47
Minutes of the Interim Meeting, Executive Committee, <i>George L. Webster</i>	49

PRESIDENT'S SECTION	56
EDITORIAL	62
ANNOUNCEMENTS	64
NEW LITTLE PEOPLE	69
MARRIAGES	69
STAFF CHANGES	69
GENERAL NEWS	71
BOOK REVIEWS	74
NEW BOOKS	84

AUTHORS IN THIS ISSUE

- A. N. Jorgensen**, President, University of Connecticut (Ph.D. State University of Iowa; Honorary Degrees: Litt.D. Coe College, LL.D. University of Maine, LL.D. University of Rhode Island, Sc.D. Rhode Island College of Pharmacy and Allied Science, LL.D. University of Massachusetts)
- R. A. Lyman, Jr.**, Chairman, Department of Zoology, Director of Student Health Service, Idaho State College (Ph.D. Johns Hopkins University, M.D. University of Nebraska)
- N. H. Meyer**, Director of Market Research, Parke, Davis & Company; Member of the President's College of Pharmacy Alumni Advisory Committee, Ohio State University (B.S., Ohio State University, Harvard University)
- Ernest Little**, Dean Emeritus, College of Pharmacy, Rutgers University (Ph.D. Columbia University, University of Graz, Austria; Honorary Degrees: Sc.D. Philadelphia College of Pharmacy and Science, LL.D. Temple University, Ph.D. Rutgers University)
- Tom D. Rowe**, Dean, College of Pharmacy, University of Michigan; Vice President, AACP (Ph.D. University of Wisconsin)
- Arthur G. Zupko**, Dean, Brooklyn College of Pharmacy, Long Island University (Ph.D. Purdue University)
- James A. Kearns**, Associate Professor, Rutgers University (Ed.D. Columbia University)
- Arnold D. Marcus**, Assistant Professor of Pharmacy, Rutgers University (Ph.D. University of Wisconsin)
- George Hager**, Senior Scientist, Smith, Kline & French Laboratories (Ph.D. University of Maryland)
- Joseph B. Sprowls**, Dean, School of Pharmacy, Temple University; Member of the Executive Committee, AACP (Ph.D. University of Colorado)
- Nathan Lindley Michener**, Professor of Pharmaceutical Chemistry, Butler University (M.A., Ohio State University)
- Richard A. Deno**, Professor of Pharmacognosy, University of Michigan (Ph.D. University of Michigan)
- Hugo H. Schaefer**, Dean Emeritus, Brooklyn College of Pharmacy, Long Island University (Ph.D. Columbia University, Ph.D. University of Berne, Hon. Sc.D. Philadelphia College of Pharmacy and Science)
- George L. Webster**, Professor of Chemistry, University of Illinois; Secretary-Treasurer, AACP (Ph.D. University of Michigan)

As our country goes forward with unprecedented policies of military preparedness, it should be remembered that along with it must go intellectual and moral preparedness.

R. A. Kuever, Am. J. Pharm. Ed., 5, 440 (1941)

Editor's Note. The following three articles were invited by the Editor. The authors were asked to present their opinions in answer to the question, "What's Wrong with Pharmaceutical Education?"

WHAT IS WRONG WITH PHARMACEUTICAL EDUCATION?

A. N. JORGENSEN

In discussing this assignment I find myself in the dual role of physician and pharmacist. In such a role I must determine the nature of the weakness to effect a diagnosis. It is further necessary that I come to some conclusion about the course and termination of the ailment in order to produce a prognosis. I hope to compound some remedy to cure the difficulty.

The diagnosis is not a complex one for those of us who, as educators, have been interested in professional education. The main difficulty lies in the evolution of the professional curriculum in pharmacy and in the development of this program beyond the high school. The same difficulty was experienced in the development of the programs of training for dentistry and for medicine, as well as in other professional areas. Since they faced the situation much earlier than did pharmacy, we can benefit by their experiences and profit by their mistakes.

Certainly great changes in pharmaceutical education have been effected in the past half century. At the turn of the century course work had advanced little beyond a directed apprenticeship, although there were enlarged programs of applied work of a more technical nature. From the early days of no formal training, through the two year program to a three year course in 1925 and then to a four year program in 1932, the principal results of such increased training were manifest largely in the incorporation of new professional courses. The programs of training sought primarily to aid the student in becoming more expert in the preparation, dispensing, and use of drugs. Each increase in time found the various disciplines involved in pharmaceutical education battling for their share of the increased number of clock hours in order to advance their part of the training. Consequently the extension of the program reflected a greater number of courses and not a studied review of the objectives of pharmaceutical education. There was little study of the subjects and subject matter selected, and no attempt to organize to meet well-defined objectives. The course "just grew" like Topsy. Extreme specialization *per se* does not necessarily produce the most competent practitioner.

Little attention was given to the important aspect of general education in this professional training. This lack or isolation of general course work from professional training inevitably developed provincialism in these trainees. It was forgotten that the very nature of a pharmacist's activities and the outlook which would aid him in his practice are inherent in an active social environment. He needs an understanding of world problems, an appreciation of the arts, and a

broad concept of the ideas and ideals of our civilization. Curricular interest should not use as its goal the production of successful practitioners alone, but should also recognize the school's responsibility in training for effective citizenship and in the preparation of its students in the ability to adjust themselves to the problems of adult life. Never has there been a greater need for this education for intelligent citizenship, whether it be in the professional or nonprofessional areas.

It is likewise important that in curricular studies the rapidly changing events in the commercial and professional practices of pharmacy must be recognized. Students now in college, and those presently in high schools with future interests in pharmacy, will be practicing their profession during the last years of the twentieth and the beginning of the twenty-first centuries. We must try to envision the requirements and opportunities as they will exist in the practice of pharmacy.

The intensity of the training now required under the four year program places great demands upon the trainees. A program which carries at least 15 per cent credits more than most academic programs creates pressures which are not desirable in professional training. Such heavy loads do not allow adequate time for the assimilation and digestion of the principles so important in later application in the field. Frequently this results in reliance upon memorization to acquire a minimum of knowledge merely to pass the course. Any overcrowded program of training encourages undesirable practices.

In such a heavy and rigid curriculum there is little chance for an individual to develop his personal interests or to display his capacity for learning in any particular field. The many values latent in a student's participation in extra-curricular activities are made difficult and in many cases impossible to attain. Certainly in a profession where public relations is such an important feature of practice, there should be time for contacts in organization work.

Time for increased emphasis upon training for living, as well as training for a living, should be made available to allow students to participate as active campus citizens. It is with interest that I watch the development of the five year program of training. I hope that the lessons of past evaluations of the curriculum will result in a better integration of the professional and general education courses. The objectives in the science area in general education have been so well stated in the remarks of the President's Commission on Higher Education, in 1947, that they bear repeating here: "To understand the common phenomena in one's physical environment, to apply habits of scientific thought to both personal and civic problems, and to appreciate the implications of scientific discoveries for human welfare."

With a realistic revision and implementation of the curriculum, there must be a continued search for the qualified students to receive such training and the dedicated and able teachers to interpret and counsel.

It is important that you seek out interested students, willing and qualified to meet the heavy demands placed upon public health servants. Active recruitment programs should be continued and extended. A profession as important as one dealing with the matters of life and death latent in a prescription cannot afford to recruit any but the most able students. The development of an adequate predictive test for prospective students should be made available as an aid in their selection. While the largest number of your graduates may choose to serve as practicing pharmacists, the program should not neglect those students whose

interests and abilities lie in areas of study leading to research, manufacturing pharmacy, and teaching, among other vocations. The teaching is by no means the least important part of your training responsibilities, for only through well-trained and inspiring teachers can we develop the curricula necessary to provide qualified personnel to serve in retail and industrial pharmacy. The teaching role must be made attractive so that we can meet the challenge of industry and retain in our teaching institutions those who can inspire and teach. Such an active recruitment program is necessary to maintain your vocation. The program of training must be studied in light of these more recent vocational training additions to the curricula.

In this diagnosis, the complaint is a common one known as "professionalitis." It is not fatal, but the patient will show great improvement if we prescribe the remedies now available. The first such treatment became available about thirty years ago with the development of the *Pharmaceutical Syllabus* directed by W. W. Charters and developed under the Commonwealth Fund. The real turning point in the history of pharmaceutical education was marked by the support of the American Foundation for Pharmaceutical Education and the cooperation of the American Council on Education. This resulted in the study under the able leadership of Dr. Edward C. Elliott. This study, issued as the *Pharmaceutical Survey*, pointed the way for the betterment of all phases of the pharmacy program and profession.

The prognosis is that the course of the ailment will continue as long as we fail to recognize the need for proper integration of professional and general education in our programs of training. The termination of this weakness will come only when we enlist the best of students for this training and recruit able teachers who can interpret the objectives of modern pharmacy. There is ample evidence that with the present leadership among the young, as well as with that of the older members in responsible positions, the difficulties will be faced realistically and the answers found to solve these minor ills of professional growth. The future for pharmaceutical education is bright, for there is nothing presently wrong that cannot be adjusted by intelligent effort and labor.

They accomplished an improvement of medical education wholly by the power of publicity and not by any power lying in the forces of law, not in any power that related to the courts—only the power of publicity! When an aroused public learns of an evil that exists which affects intimately their health and their lives, the public may be depended on to take the matter into their own hands and to aid the profession concerned in raising its standards.

Morris Fishbein, *Am. J. Pharm. Ed.*, 464 (1941)

WHAT'S DANGEROUS TO PHARMACEUTICAL EDUCATION *

R. A. LYMAN, JR.

I have been asked to adopt as a subject "What's Wrong with Pharmaceutical Education?" Such a title would suggest that pharmaceutical education is a single entity. To me it appears that pharmaceutical education is an assemblage of independent persons and institutions united only by certain ideals and traditions. I hope that is so, and that it remains so, because, while there may be strength in closer union, there is apt to be compulsion in it also; and compulsion in education is to be feared as is nothing else. The shortcomings of pharmaceutical education, like its virtues, must vary from person to person and from institution to institution. Instead of presuming any general defects in pharmaceutical education, I prefer to consider a danger confronting it everywhere: the danger that we convert our professional schools into trade schools. This hazard is not one peculiar to pharmacy alone. It threatens the fields of medicine, dentistry, nursing, and education as well. It becomes acute whenever the practitioners of a profession become too influential in the professional school. Already I suspect that we have too many physicians in medical schools, too many dentists in dental schools, too many nurses in nursing schools, and too many pharmacists in colleges of pharmacy. They are likely to emphasize the detailed technical instruction of a practical nature to the exclusion of everything else.

Let us look at this word "profession" and try to discover what it really means. Pharmacists are fond of the term, for it has an honorable connotation—honorable because it suggests service performed unselfishly and with integrity by a learned person. The designation also carries with it an implication of responsibility; for by reason of their learning, and by reason of their integrity, professional people are expected to assume the intellectual and moral leadership of society. The word also has a lucrative connotation, for reward is expected as an accompaniment of honor and as payment for responsibility. When I hear practitioners of any sort bewailing the fact that their calling is not as "professional" as it might be, I always wonder which they are yearning for, the honor, the responsibility, or the lucre. Often I suspect that they would gladly settle for the lucre, although a trade has never elevated itself to the status of a profession by raising the cost of its services. Professions have lost standing by so doing.

There seems to be a conviction among pharmacy students and even among teachers of pharmaceutical subjects that the essence of professionalism is practical technical knowledge. It isn't. The essential difference between a trade and a profession is that, while both demand practical technical knowledge, a profession requires a depth and breadth of knowledge that goes far beyond the immediate needs of the moment. A profession also requires adherence to a recognized system of ethics. This definition of "profession" does not arbitrarily include any specific calling, nor does it exclude any. To the extent that a physician, a farmer, a pharmacist, a carpenter, or a teacher has practical knowledge, possesses a basic understanding beyond the immediate demands of his work, and observes a system of ethics appropriate to his field, he is a professional man. When a course of study neglects any of these ingredients of professional training, it produces tradesmen rather than professional men.

It is my concern that pharmacy is overemphasizing practical technical training and neglecting the deeper fundamental training that is equally essential. That

* Also presented to the District 7 Meeting, AACP, Missoula, Montana, 1956.

students of pharmacy often betray an impatience with knowledge having no apparent direct bearing on drugstore pharmacy is of little consequence, unless it reflects the opinion of elements on pharmacy faculties. Why do we find courses taught by members of pharmacy faculties—courses in elementary mathematics called “pharmaceutical calculations,” courses in analytical chemistry called “pharmaceutical chemistry,” courses in immunology called “biologicals,” courses in public health called “sanitation for pharmacists?” What does the designation “for pharmacists” mean? Does it carry the same connotation that “for home economics” or “for physical education” does? This is intended as no quibble over course titles. It is a question of course content. At best “for pharmacists” implies that the course contains what someone thinks a pharmacist needs to know about the subject and little else. For some obscure reason these trade-school type courses are called “professional” if offered by members of the pharmacy faculty! What is the rationale of “slanting courses to fit the needs of the students?” Can you or I select from any basic subject the information that a pharmacist will need, but that a physician or dentist or biologist will not? Our selection might follow what was needed for training a pharmacist for the past, or, at best, for the present. Our mission is to prepare students for the future, and what will be needed in the future may not be what is practical today.

The best that we can do is give our pharmacy students standard courses taught whenever possible by nonpharmacy faculty. In so doing we will strengthen not only pharmacy but the subject departments that are urgently in need of the support that a well-organized profession like pharmacy is in a position to give. We all know that a professional school is only as strong as the basic subject departments that lay the foundation upon which subsequent training rests. Pharmacy students need contact with nonpharmacy faculty and students. Only through such contact will they learn that pharmacy is not a subject set apart from other fields of learning but is blended of the mathematical, physical, biological, and social sciences and that these also share other common ground.

The existence of special courses for our students suggests that we are endeavoring to make pharmacists as pills are made in a press or as tradesmen are made in a trade school. No professional school should try to turn out a finished professional man, because if it even makes the attempt it does so only by neglecting its own duty. The making of a man into a pharmacist is his own task, and no one can do it for him. He has two preceptors: the school and the practicing pharmacist. From the practicing pharmacist he learns the drug business, and from him also he learns the actual ethics as opposed to the theoretical ethics of the profession. It is the obligation of the school to help the student to discover the pure delight of learning for the sake of knowing. He must be led into many fields as far as our knowledge, his understanding, and four short years will permit him to go. And then he should be left a while to wander about, to question, and to wonder. He may find that in science there are no final answers, no ultimate truths, and no complete security—only limitless opportunity and encouragement to wonder. The more profound his knowledge, the greater his capacity to wonder and the greater his satisfaction in wonderment. Should he be sufficiently brilliant and painstaking he may find some bright new truth; but such is not the only goal, nor even the real goal. More likely he will find things of value to him alone, perhaps understandable to him alone, things of no immediate use in the drugstore, but ideas upon which he can think for the rest of his life and upon which he can build the structure of his personality.

PHARMACY AND PHARMACEUTICAL EDUCATION

N. H. MEYER

Unanimity of opinion on any important subject is in itself dangerous. I feel reasonably certain, therefore, that the comments to follow may be, at times, divergent from the thoughts of others who may share an equal interest in the future of pharmacy. These comments, however, represent the experience of one who has been associated with pharmacy in most of its phases for some thirty-odd years, and are recorded objectively, a feature which is frequently passed without censure in narrations masquerading to be for the good of pharmacy.

We hear from many sources the familiar declaration that we must be tireless in our efforts to promote the advancement of pharmacy through pharmaceutical education; but one wonders how pharmaceutical education can advance the profession of pharmacy without continued increase in the number of qualified students enrolling in our nation's centers of learning. A shortage of qualified pharmacists, despite arguments to the contrary, is apparent in all branches of pharmacy, whether it be in research, industry, development, hospitals, education, public health, retail, or other areas of this profession. In some quarters there is deep consternation at mention of need of more pharmacists, yet we must of necessity face this situation objectively and give full consideration to the urgency of programs needed to attract students to pharmacy.

It is with keen disappointment that one can find apathy on the part of many practicing pharmacists when they are asked to give voluntarily of their time and effort to expound the virtues of pharmacy to students of high school and college age. We need more salesmen for pharmacy. The number aggressively selling pharmacy is all too small. Compare this attitude to that of physicians, of lawyers, of engineers, and of members of other respected professions who are constantly encouraging qualified prospects to enroll as students in their respective fields. In my contacts with pharmacists over the years, it has been a disappointment to find so few who are enthusiastic in recommending pharmacy as a profession to student prospects. As pharmacists, we should be unhesitating in our praise for our profession, and, through local, state, and national pharmacy organizations, we should encourage speakers to appear at high schools and groups such as Rotary clubs to tell the story of pharmacy and emphasize its close association with the medical and other health professions in the preservation of health and the care of the sick. Deans and staff members of colleges of pharmacy can be of material help in coordinating and directing such programs. Further, state boards of pharmacy should be encouraged to expand their public relations programs to effectively sell pharmacy as a profession.

Increased numbers of pharmacy student prospects are not logically the complete answer to the problem. Careful evaluation of each applicant and of each student has become as important as any factor in recruitment. If we are to upgrade the profession of pharmacy, we must have the respect of the other associated professions, for these professions can and will judge pharmacy by the type of students selected in the colleges as well as by the training offered and by the quality of instruction. In my opinion supplemental predictive testing of candidates for pharmacy warrants further study and consideration as an aid in student selection.

Among other things, too few students know that pharmacy offers many areas of employment and that not all pharmacists work in pharmacies. Many are unaware that some 10,000 pharmacists are engaged in other fields of pharmacy where rewards are both satisfying and lucrative. Motion picture films, books, pamphlets, and brochures have been prepared to aid the undecided student in choosing a vocation, but the fact remains that students want and need serious information and vocational guidance in addition to these impersonal invitations. There is no substitute for inspiring advice from an experienced and respected member of the profession. We should give more consideration to what practicing pharmacists, in all branches of pharmacy, can do to contribute to the growth and development of pharmacy, and not rely entirely on pharmaceutical education alone as the therapeutic agent to correct real or imaginative illnesses of the profession.

Admittedly, pharmaceutical education has progressed immensely during the past two decades, as evidenced by expanded curricula and improved facilities offered by the various colleges throughout the country. It has been said that in this world nothing is certain but death and taxes—to these two certainties we should add "change." We must expect and prepare for changes in pharmaceutical education. Some skeptics, however, will quarrel with the tendency toward longer courses leading to advanced pharmacy degrees, whereas others will argue for continued extension of these courses as a means, in their opinion, of advancing pharmacy to even greater heights. It seems logical, therefore, to evaluate some of the pertinent obligations colleges of pharmacy have both to the student and to the community, and then perhaps one can judge fairly whether these educational goals fully meet the demands of our social and economic systems.

Our pharmacy colleges must adequately train qualified pharmacists not only for assignment in retail, hospital, and institutional pharmacies, but also for research, education, management, and other responsible positions in the pharmaceutical industry and the profession. Colleges of pharmacy must prepare and train graduates in pharmacy as educators who will be qualified to train undergraduate and graduate students not only in professional services, but also in areas of good business practice. It is in the latter area of instruction that more emphasis could be placed, since it is common knowledge that many failures in retail pharmacy can be traced to the door of "inadequate business training."

There is not a scintilla of evidence that some magic fairy will wield her golden wand to protect tomorrow's retail, hospital, wholesale, or manufacturing pharmacists from increasing problems of management, labor, merchandising, marketing, and general economics. Consequently, to meet these demands our pharmacy schools must provide training by qualified instructors preferably experienced in all phases of business administration and in active contact with the business world.

Because of the interest manifested by pharmaceutical and chemical manufacturers in graduate school personnel, pharmacy colleges in the future must train research workers in an environment that offers outstanding library, laboratory, hospital, and other facilities. Colleges must create a "firing line" of pharmacy "salesmen" by adequate and regular contact with pharmacy alumni. The familiar expression "out of sight, out of mind" characterizes the mental attitude of many graduate pharmacists no longer actively in contact with the progress and changes in pharmaceutical education.

If pharmacy colleges are to continue to provide the finest educational founda-

tion, they, as well as practicing pharmacists, must give attention to the preservation of pharmacy by recognizing the effects of current social and medical trends which affect the worthwhileness of the profession of pharmacy. Preservation of pharmacy as a profession will depend upon corrective steps effected in pharmaceutical education, attuned to trends and made as necessary to meet the year-by-year developing complexity of pharmacy. Due to the trends in medical practice, medical colleges are training more physicians in specialized services. Pharmacy colleges need to give increased attention to similar trends in the demand for specialized services in pharmacy. Colleges have a greater responsibility than mere preparation of students for state board of pharmacy examinations. Graduates in pharmacy should be equipped to serve the professional needs effectively. Consequently, colleges need more frequently to consider their objectives and adjust their programs accordingly.

Mention has been made here of the necessity of training qualified educators in pharmacy, and at this point I should like to stress the importance of training educators for deanships in our pharmacy colleges. Pharmaceutical education can easily become a peregrinating pool of knowledge unless it is administered by deans of high administrative capacity.

Pharmacy colleges will have to be alert to the increased centralization of medical care due to the various health plans, whether they be promulgated by private or federal interests, which result in an increased demand for pharmacists in hospitals, clinics, government services, and other health units. We may even visualize the time when the need for pharmacists in such areas of professional service may equal or possibly exceed that for those in today's retail pharmacies. This brings into focus, with greater definition, the need for education of pharmacy students in closer association with medical schools so that a better understanding of health problems is promoted between members of these two professions as early as possible in the students' training. Increased absorption of pharmacists into fields other than retail pharmacy has not been fully recognized and assessed by pharmacists generally. This may be a factor accounting for considerable controversy regarding pharmacy college curricula and length of courses.

Colleges would do well to keep in sight the ever-increasing cost of pharmaceutical education and to tune the requirements of the profession of pharmacy to needs and demands of the times. As a result, more qualified individuals may be encouraged to consider pharmacy as their life's vocation in the years to come.

Lastly, pharmacy colleges need to better understand today's high schools and high school students so that the problems and changes occurring in the pre-college phase of education can be coordinated with aims and purposes of pharmaceutical education. Most high school students are confused regarding the work, educational background, professional responsibilities, and opportunities of pharmacists; and they generally appear surprised when informed of the extent of the professional training and of the professional services rendered by pharmacists.

Someone said that "there will always be an England"; as surely there will always be a profession of pharmacy, but whether pharmacy will remain a profession or become a "half" profession will depend upon how well practicing pharmacists and pharmacy colleges lead the way in upgrading pharmacy through continued recruitment of qualified students who will engage in the best that we can offer in the way of pharmaceutical education.

A LETTER FROM DR. ERNEST LITTLE

The following letter is published with the permission of the author as a compliment and a challenge to pharmaceutical educators.

Dr. Melvin R. Gibson
Pullman, Washington

Dear Dr. Gibson,

Thank you so much for your invitation of September 19, to write an article for the Journal on "*What's Wrong with Pharmaceutical Education?*"

I do greatly appreciate your invitation, but feel I should decline. I believe I could write such an article that would at least be acceptable, but it would not be entirely sincere.

I know, of course, that pharmaceutical education must continue to change in order to progress. I believe it will. We are proud of its progress today; I am certain that we will continue to be.

When I was active in Association work, we did not have the large number of capable, well-trained young men on the staffs of our colleges of pharmacy that we have today. They know the path it should take, and I am confident that they will give it proper guidance.

I am more conservative now than I was two decades ago, perhaps too much so. I am quite willing to accept the judgment of young men in our profession. I am *certain* they will be right.

Pharmaceutical education *must* continue to progress in order to be something different tomorrow than it is today. I am no advocate of maintaining the status quo. Such an attitude leads only to decadence. On the other hand I feel that there is not much that is wrong with pharmaceutical education. I feel there is *much* that is right.

Thanks again for your invitation of September 19. I trust you will not misinterpret my declination.

Cordially
Ernest Little

If anyone doubts that progress has been made, let him look back and see where this Association came from.

R. A. Kuever, Am. J. Pharm. Ed., 5, 439 (1941)

ARTICLES

PROBLEMS ENCOUNTERED IN REVISION OF A PHARMACY ACT *

TOM D. ROWE

When Wilbur Powers invited me, several months ago, to talk before this group, I was delighted to accept. I was glad not only because of the opportunity to tell you about some of our experiences in Michigan but also because it gave me, a college teacher, an opportunity to meet once again with board members and to discuss problems of mutual interest. One of the highlights of each year to me is the annual district meeting of the boards and colleges. I feel I get as much and possibly more out of these meetings than any others. One of the reasons is that the group is small and we all have a chance to participate. Even more important, it gives me a chance to learn some of the problems of the boards and to learn what the various board members are thinking, about their own problems and ours. It is a broadening experience and a most profitable one. After all, the colleges and boards have a lot in common, but we don't have enough opportunities to share our thoughts.

It can't be helped that at this national meeting your group and ours have their sessions scheduled at the same time. This arrangement is unfortunate because it does not give us much of a chance to attend each other's sessions. I am, therefore, especially pleased to be able to appear before this group today, because, either in open discussion after this presentation or in private talks with some of you present, I will receive a lot of good ideas which will be helpful to us in Michigan. Thus, I expect to learn more from you than you will from me.

There are many of you in this audience who have had experience with introduction of new bills or even entirely new pharmacy laws to your legislatures. No doubt some of the problems you have met are identical with those we have encountered. Mr. Powers felt, however, there were enough differences in our approach and in our problems so that the story of the revision of the Michigan pharmacy law would be of interest and help to you.

For the past two years the Legislative Committee of the Michigan State Pharmaceutical Association, under my chairmanship, has been rewriting the Michigan pharmacy law. The current law, passed in 1885, like the pharmacy laws in many states, is outmoded and weak. Although the original law has been changed from time to time, including a number of extensive amendments in 1913, it is inadequate for present-day practice.

Perhaps one of its greatest weaknesses is the wording of the various sections. Many of the statements are ambiguous. They can and have been interpreted in a number of different ways. This situation has made it difficult for the Board of Pharmacy to enforce properly the intended meaning of the requirements. For example, under the present wording it is doubtful whether a pharmacy needs to have a registered pharmacist on duty in order to be within the law. With such basic weaknesses, it is obvious a new pharmacy law is badly needed.

* Presented to the NABP, Miami Beach, Florida, 1955.

In 1953 the Legislative Committee of the Michigan State Pharmaceutical Association undertook rewriting the law as its main objective, and now has a revised statute before the Michigan Legislature. The proposed act represents the thinking of practicing retail pharmacists, hospital pharmacists, manufacturing pharmacists, the Board of Pharmacy, the colleges of pharmacy, and other interested groups within the state. Each of these groups has representation on the Committee or was asked to send representatives to the various Committee meetings.

More specifically, the Committee had an official membership of twenty-two persons who were from fourteen different localities of the state and of whom sixteen were practicing retail pharmacists. In selecting the Committee, efforts had been made to have represented nearly every geographical section of the state, and to choose men who were interested in this project and willing to work. The selections turned out to be good ones because most all of the members attended every session we held. We began holding meetings after a few months of study had been put in by the chairman and his legal advisers. From September, 1953, to June, 1954, we held four meetings. None was held during the summer, but two more were held before the bill was ready for introduction. Many of these members would drive over one hundred miles each way to attend these sessions which lasted from three to four hours. It was heartening to me to realize we had so many people who were interested enough to go to so much trouble to attend these sessions and do their part to help pharmacy.

While those of us on the Committee had ideas about what should be included in a new act, we did not have all the details in mind. Being laymen as far as legal language and technicalities were concerned, we realized, furthermore, we would need competent legal advice and assistance throughout our project. We were fortunate in having this needed legal service available within the University of Michigan. The Legislative Research Center of the Law School had been set up several years ago with one of its purposes to help improve the laws of the State of Michigan. Financed by an endowment left by W. W. Cook, the Legislative Research Center provided legal manpower to work with us at no cost to the Association.

Mr. William Pierce, Associate Director of the Center, was given this assignment, and through him staff members of the Center worked on the Bill. The legal representatives did not participate in policy making, but advised on the constitutionality or legality of ideas proposed by the Committee. They also phrased the various sections based on decisions made by the Committee. I cannot overemphasize the important role played by Mr. Pierce and his colleagues in helping us to obtain a well-written and strong law.

Our legal colleagues did not attend the first Committee meeting, at which I must admit we accomplished little because of the legal questions which kept arising. A member would propose an idea, others would question its legality, and no one had an authoritative answer. After that meeting, one or more Legislative Research Center representatives attended every session, and we made continuous progress.

Our general method of operation was as follows:

A list of policy issues was drawn up for each meeting. Such questions were asked as: Shall the members of the Board be limited to two five year terms in office? Shall they be nominated by the State Association? Shall the practicing pharmacists pay an annual fee for registration?

After full discussion, a policy decision on each question was made by the Committee. Affirmative decisions were referred to the lawyers, to be put into legal language. At the next meeting the phraseology of the lawyers was presented for approval or disapproval by the Committee. Additional policy matters were then introduced, and the cycle was repeated. We finally reached the point where the first draft of the Law was ready for presentation. A copy of this draft was given to each Committee member, to the secretary of each local or county organization, to each State Board member, to the Michigan State Pharmaceutical Association Executive Committee members, and to other interested parties.

The local association secretaries were asked to present the act in its entirety or in sections to their constituents for discussion. In this manner it was hoped to reach all practicing pharmacists in the state and obtain their reactions and suggestions. We received many helpful suggestions and criticisms. All of these were carefully studied by the Committee, and, if accepted, were incorporated into subsequent drafts of the bill. During this procedure, we encountered a number of controversial problems. Some of these we were able to resolve to everyone's satisfaction, while others had to be compromised or dropped entirely.

The one that gave us the most trouble was the question of annual re-registration. Michigan is one of the few states which has lifetime registration. No annual renewal is required. It was proposed that we include an annual re-registration requirement. Some of the Committee members were against this from the beginning, and when we heard from the county groups it seemed as though they were all against it.

Many of the Committee members felt that some record of the pharmacists should be made each year, and perhaps a way could be found which would enable this to be included in the law without requiring re-registration. That, it seemed, was the main bone of contention.

We referred the problem to our attorneys to see if they could draw up a solution for us. They did, in the form of a proposal for an annual fee and the classification of all pharmacists as either active or inactive. Those who paid the annual fee were active and could practice pharmacy; those who did not pay were inactive and could not practice. The important point was that the inactive pharmacists retained their lifetime registration and could become active at any time by payment of the fee for the current year. No back fees were required.

Personally, I felt this was an excellent solution and apparently the Committee did too, because it was approved. Many of the pharmacists in the state did not approve, and a few days before the bill was introduced we had to delete that portion entirely. To have left it in would apparently have insured the death of the bill.

Another controversial point was the appointment of state board members from a group nominated by the State Association. Under our present law the State Association has no official hand in the selection of board members. The opposition was not so much against having the State Association make the nominations, but they were concerned to know how we could be assured that a governor would pay any attention to them. Under the Michigan constitution, we cannot require the governor to select from the Association's nominees. It was pointed out that most of the other health boards in the state had a provision for the respective state associations to make nominations and that usually the governors had selected from the association's recommendations. While we could

not promise that one of our Association nominees would always be approved, we could give reasonable assurance that such would be the case. This explanation seemed to settle the problem satisfactorily in most instances. There were, however, some individuals who, I am sure, would have liked to have had the state constitution revised in order to force a governor to take our selection.

Another extremely controversial problem was what to do about restricting the sale of certain types of drugs to drugstores. Michigan had within the past few years lost a court decision on this matter so that grocery stores and other nondrug outlets were in a position to operate without much restriction. We asked our attorneys to study the problem from a legal viewpoint both for Michigan and the rest of the United States. They spent considerable time reviewing court decisions bearing on this problem. In the end they submitted a nineteen-page single-spaced report describing their findings. I had heretofore considered most legal documents dull and uninteresting, but found this one to be of real interest. We had the report condensed and submitted it to the Committee. After full discussion we decided we should not attempt to include such a restrictive measure in our proposed act. We felt to do so would mean defeat of the rest of the bill. We decided therefore to try to get a good basic law without this provision. If the bill we have now entered passes, we will, either next year or the year after, enter a separate bill dealing with this problem and fight that out without involving all of the rest of the law. The omission of such an important section does of course weaken our proposed act, but even so it is considerably stronger than our current one.

There were many other problems of a different nature, only one of which I will mention. This had to do with the definition of "drug." We wanted something which would stand up in court and would be nearly all inclusive. We did not feel the definition proposed in the Uniform Pharmacy Act was completely satisfactory for Michigan. For example, in the Uniform Pharmacy Act the definition refers to articles recognized in the USP and NF or *any* supplement to them. The last portion of this requirement is unconstitutional in Michigan. We can pass laws based on current standards only and not on future ones. We had to make a number of minor changes in the definition similar to this one in order to meet Michigan requirements. In the end our definition carries the same general ideas as does the one in the Uniform Act. Actually, when our definition is read and compared with the others, no great difference is apparent, yet our lawyers spent days in writing one which would be satisfactory and also constitutional in our state. We hope we have succeeded in doing just that.

Usually after each Committee meeting enough changes, additions, and deletions had been approved that a new draft had to be drawn up. This meant the complete re-doing of many pages and not just the changing of a word here or there. Practically every one of the fifty-four pages has been rewritten one or more times during the two year period the bill was being worked on.

In addition to the Committee meetings, the Chairman and lawyers had a number of separate meetings with manufacturers' attorneys. These meetings were necessary because we include in our bill a state drug and cosmetics act, patterned after the federal law.

There were of course almost daily conferences with our legal advisors and numerous special meetings and much correspondence with various interested people.

Thus, each time a draft was produced, it was a major undertaking and could not have been done without what amounted to full-time legal service.

After we had been through the first two or three drafts, members of the Committee and the legal advisors visited county meetings throughout the state. About fifteen or twenty sectional meetings were attended, and the changes in the proposed act were presented for discussion. In most instances, reaction was favorable. Certain points were sometimes sharply criticized, usually by a small minority. At these sessions legal questions frequently arose, and were discussed and answered by our lawyer. Almost always he was able to clarify points that otherwise would be misunderstood.

In many instances satisfactory answers were given by the lawyers because of their knowledge of court decisions and of pharmacy laws in other states. They had made a thorough study of these because of the questions which had been raised in the Committee meetings.

Seven drafts of the Law were prepared during the two years of study. The sixth draft was revised partially three times. The seventh draft has finally been presented to the Legislature. In addition, a letter explaining our activities was sent to each legislator along with a brief summary of the changes. A cross-file reference was drawn up, so those who were interested could compare the old and the new laws. Before introducing the bill to the Legislature, we had received a unanimous vote of approval for so doing from the members of the Michigan State Pharmaceutical Association at its 1954 meeting.

Even with this approval opposition arose from various quarters as we proceeded with the project. I think the most trouble came from three sources: (1) Individuals who had not actually read the law but had heard about it; (2) Individuals who had strong preconceived ideas of what should be in the law; (3) Individuals who were fearful that the law would place too heavy restrictions on them. When objections from these sources were in the open, we were usually able to explain our position satisfactorily.

It is the unknown sources of opposition which have presented and continue to present our greatest problem. For example, we recently learned that one of the State Representatives was ready to introduce a bill which would have ruined our internship program. We were able to reach a satisfactory compromise with the Representative, but we still do not know who requested him to introduce such a bill. We also understand that some store owners, presumably running stores just within the law, are carrying on an unorganized campaign to defeat certain portions of the bill. The opposition, we believe, is considerably stronger than appears on the surface. It is unfortunate that our strongest opposition is coming from within the ranks of pharmacy. We believe the Legislature would pass our bill without hesitation if we had a united front. We have worked hard toward that objective and think we have a large majority of the practicing pharmacists in the state behind us. It will be a tragedy if a selfish minority within our profession are able to prevent the passage of a bill written in the best interests of pharmacy in the state of Michigan.

The State Board of Pharmacy has cooperated to the fullest extent with the Legislative Committee, and the advice of the Board Secretary, Mr. O. K. Grettenberger, has been of utmost value. Without their interest and assistance a satisfactory law could not have been drawn up.

Perhaps some of you in other states are rewriting portions of your law or are contemplating doing so. If you are, I think the best suggestion I could make

would be to obtain competent legal services early in your project. I am assuming you will have the cooperation of your Board Members and of its Secretary. Financing the legal service may be a problem. We were fortunate in not having this problem. I know that the legal services received by us would have cost thousands of dollars had we been required to pay for it. I feel, however, that a lawyer's service in a project of this type is so indispensable that special effort must be made to provide it. The money spent will yield an end product far superior to what otherwise can be obtained.

It is not feasible to present in this paper a list of the major changes made nor to describe all the improvements in the new bill. It is unquestionably a much better law than the one now in operation, but it is far from perfect. As already pointed out, there are some weaknesses of which we are aware, but which we cannot strengthen at this time. No doubt other weaknesses will appear if the bill is passed. Even so, we are confident it will help raise the standards for the practice of pharmacy in Michigan and give better health protection to the public.

If we will only keep before ourselves that fundamental statement which Percival wrote so many years ago, that there must be an etiquette between the doctor and the pharmacist which will never diminish the authority of one and the respect of the other, we will have an attitude which resembles the Golden Rule.

Morris Fishbein, *Am. J. Pharm. Ed.*, 5, 473 (1941)

A SURVEY OF REFRESHER PROGRAMS OFFERED THE PHARMACIST BY COLLEGES OF PHARMACY

ARTHUR G. ZUPKO

The perennial challenge confronting pharmaceutical educators is that of providing a worthy program of continuing education for the pharmacy practitioner. Some have met this challenge with a fair degree of success after considerable effort; others have expended much time and energy in promoting such programs only to be confronted with a lack of interest on the part of the practitioner. Still others, after repeated attempts, have become utterly discouraged and frustrated to the point of abandoning all efforts in this direction. As a matter of fact, a recently conducted survey indicates that only approximately one half of our colleges of pharmacy are providing in-service training programs with any regularity. Further study of this problem seemed warranted, and the findings constitute the purpose of this paper.

Known by such names as an in-service training program, refresher course, pharmacy postgraduate clinic, extension service course, conference, seminar, etc., the continuing education program represents one of the most important areas for future development in pharmaceutical education. While it is true that many practitioners do not care to be refreshed, nevertheless, colleges of pharmacy have the responsibility of providing such programs and affording the practitioner opportunity to attend these offerings. Many reasons for this viewpoint may be advanced, chief among which may be cited:

1. The continuing advances in the pharmaceutical and medical fields as well as the changing economy make it imperative for the practitioner to acquire scientific and business knowledge far beyond that obtained during his school years. As a pharmaceutical specialist he has the responsibility to both the public and the physician to keep abreast of scientific progress, and it is to his personal advantage to learn of the newer methods and techniques of business management. The pharmaceutical educator can provide an inestimable service to the practitioner by making this knowledge available to him through a regularly continuing education program.
2. A college of pharmacy with no program of continuing education can rightfully be accused of showing a lack of interest in the practitioner and his problems. To obviate such criticism the pharmaceutical educator must continue his efforts to provide such a service, even in the face of lethargic interest exhibited by the practitioner.
3. The continuing education program may be used to stimulate alumni to return and renew their interest in the college. The obvious advantages of strong alumni support to both independent and state supported colleges are manifold and need no elucidation. Any alumnus will take greater pride in his alma mater when he knows a specific service is offered him after he has left the confines of the college.
4. In general it has been found that those practitioners who attend continuing education programs are favorably impressed and return to their respective practices with increased good will toward the college. Few can deny the value of such publicity.

5. Finally there is no doubt that many types of programs can be offered which will afford a closer liaison between pharmacists and the allied health professions. A better understanding between the pharmacist and the physician, dentist, podiatrist, or veterinarian is certainly a worthwhile objective for attainment.

In the light of these advantages to both the college and the practitioner, it would appear, at least in theory, a simple matter to arrange a program of interest and expect a sizable audience. Unfortunately, in practice, this is not the case as evidenced by the discouragement and despair felt by pharmaceutical educators and the grumblings of dissatisfaction emanating from the practitioner. Let us examine the complaints of both sides and ascertain, not whether they are justified, but rather how they may be resolved for mutual benefit.

There is little doubt that the most serious problem confronting the pharmaceutical educator is the lack of interest on the part of the practitioner. The reasons for the practitioner's apathy are numerous, and some are worthy of further consideration. To evaluate these reasons the pharmaceutical educator, in planning a program, should be cognizant of the fact that his potential audience will have varied interests and backgrounds. The professional store owner and one operating a merchandising store will obviously have few interests in common. The background of the two year graduate will not enable him to comprehend a highly scientific presentation, whereas the four and five year graduate will have little difficulty and may even relish exposure to such information. It is apparent, therefore, that there is much need for exercising judgment in program planning.

Of considerable aid to those planning programs would be a knowledge of the problems confronting the pharmacist in his area. Regional legislative difficulties, uniform pricing, public relations, personnel and management problems, and current trends in drug therapy are but a few suggested topics that may apply to a particular locale. To plan a program without surveying the problems confronting the pharmacists in an area is much like the young researcher who orders expensive research equipment and then seeks a problem to utilize the instrument. The pharmacy management conferences held at the University of Texas, the animal health seminar at Southwestern College, and the varied refresher courses held at the Massachusetts College of Pharmacy, Minnesota, and Purdue University have all been quite successful over the years, and attest to the value of acquaintance with pharmacists' interests in specific areas. Almost all pharmacists are interested in ways and means of procuring additional income. Most of them are interested in dollars today, not tomorrow. They are not interested in a rehash of antiquated and academic problems, structural formulas of old or new drugs, or even the showing of manufacturers' films. They are interested in their immediate problems, and the sooner the program planner realizes this the more likely he is to attain success.

The pharmaceutical educator should not and cannot take the attitude of, "here it is, come and get it." Success with a continuing education program calls for hard work, determination, and persistency of purpose. If they don't come to you, get out after them. Several colleges have adopted a plan of decentralization, making it unnecessary for the pharmacist to travel long distances. The Universities of Georgia, Southern California, Texas, and Arizona, as well as several other schools, offer programs in many different parts of the state. Georgia, for example, arranges with a local group of pharmacists to present a

three hour program at a nominal charge of \$100 for the evening. In five different towns visited they have been able to draw a large percentage of the local pharmacists in those areas. Southern California has a caravan sponsored by a local firm which travels to various parts of the state and even outside the state with considerable success. This type of approach which brings the program to the pharmacist's backyard may be quite suitable in many areas; at least it warrants some consideration.

It is common knowledge that those practitioners who would gain the most never attend a continuing education program; in short, the same "old regulars" attend year in and year out. In an effort to overcome this failing several colleges, particularly in the midwest, have scheduled their programs to coincide with a campus event such as homecoming, a football game, or some other appealing circumstance to entice the pharmacist. Other colleges have resorted to enlisting the cooperation of active state pharmacy association members to present cooperative programs which tend to attract a greater audience. Occasionally the combining of offerings with a local medical group attracts pharmacists, if for no other reason than to be seen and become known to the doctors in that area. If it is feasible, there is no reason why two or even three colleges of pharmacy within a state cannot combine forces and present joint offerings for the mutual benefit of all pharmacists in the state. The State College of Washington and the University of Washington have been joint sponsors of an annual refresher course for several years.

Encouragement to attend all continuing education programs should be offered students in colleges of pharmacy. Attendance at these sessions may enhance their interest enough to attract them to such gatherings after graduation. This is future insurance, for it is the future graduate who will determine the degree of progress that can be made in this direction by the colleges in future years.

Most colleges offering refresher courses utilize the short, sporadic type of program consisting generally of a combination of professional and business topics. Several colleges have more specialized annual offerings such as a public health forum, an animal health seminar, a hospital pharmacy conference, or a pharmacy clinic dealing solely with prescription problems. No singular format will be successful everywhere owing to the differences in regional interests.

While there is no doubt that the one to three day refresher courses offered by many colleges have good public relations value, they do fall far short of the ideal in providing systematic and continuous education for the pharmacist. I do not consider it idealistic to presume that a college can offer a six, ten, or even fifteen week course in the newer knowledge of drugs or business management. Several schools have proven that such courses are feasible, notably Rutgers and the St. Louis College of Pharmacy. These courses in pharmacology, given on a noncredit survey basis, were given one night a week for fifteen to sixteen weeks. Attendance numbered one hundred or better, and fees ranging from \$20-\$22 were charged each registrant. Similar courses of shorter duration in business management have been arranged by several colleges with gratifying results. However, a college in the Southwest recently tried several fourteen to sixteen week courses and had a registration of only ten to fifteen. Obviously such a program is not suited for that area at this time, but it is quite possible that, with interest heightened by good shorter courses, an attempt can be made again with success in the future. I do not propose, therefore, that every college attempt lengthy

continuation study programs, but if your area is one in which this is possible by all means I would urge that every effort be made to offer such a service.

In reviewing the status of continuing education programs for pharmacists given by member colleges I, for one, would be extremely gratified to see every college offering some type of program, irrespective of its length. When we have reached that stage, then, and only then, would I become concerned about the paucity of the more lengthy offerings. I would urge that the AACP exert its influence more strongly upon those member colleges offering no continuation study program.

Colleges now offering a continuing education program are to be highly commended for their efforts, but there is little reason why all colleges should not make some effort in this direction. As far back as 1950 *The Pharmaceutical Survey* (1) recommended that all member colleges provide organized programs of in-service training for the pharmacy practitioner. Frankly, I am of the opinion that too little guidance and encouragement have been offered. The 1955 Committee on Curriculum of the AACP suggested that "consideration be given to the collection and publication, in a separate section of *The American Journal of Pharmaceutical Education*, of the programs for pharmacists' institutes, seminars, and similar type meetings that are conducted by the various schools." (2) It appears to me that this form of guidance would be most helpful, but unfortunately this suggestion has not been carried to fruition.

There is an increasing awareness of the need for continuing education programs on the part of the colleges, which is most encouraging. The AACP has had a special committee this past year to make a study on how the Association can assist member colleges to develop a program of continuation study for the pharmacist. It is quite possible that the Association may be helpful in this regard, but in the final analysis, in spite of any assistance offered him by the AACP, the pharmaceutical educator must continue to study the pharmacists' problems in his area and offer appropriate and carefully planned programs to meet those needs. Further, it can be stated that in spite of the excellency of any program each educator must devise ways and means of attracting the practitioner to attend. There is no simple answer to the problem; but, assuredly, the answer will not be forthcoming unless a continuing effort is put forth by each and every member college.

REFERENCES

- (1) Elliott, Edward C., "The General Report of the Pharmaceutical Survey." American Council on Education, 1950, p. 230.
- (2) Parks, Lloyd M., *Am. J. Pharm. Ed.*, 19, 533 (1955).

An association may be defined as a system which, functioning in its collectiveness, does many things and some of these things are right.

R. A. Kuever, *Am. J. Pharm. Ed.*, 5, 438 (1941)

TEACHING ARITHMETICAL CONCEPTS

JAMES A. KEARNS

As a mathematician, associated with a college of pharmacy, I was quite naturally curious when reference was made to the subject of pharmaceutical arithmetic. Since students are inclined to think that a mathematics teacher should be familiar with all types of mathematics, I had to find out, as a matter of self-defense, what the subject was about. After going through some textbooks, talking with the men who teach the course, and sitting in on classes occasionally, I satisfied myself that I at least knew what type of mathematics was being used in the course.

In the process, I became aware of the problems that our instructors were having in teaching the subject. Fortunately, my position at the college was such that I was able to take a more over-all and objective point of view of these problems. After some time, I was led to draw some conclusions as to why some students have difficulty in learning pharmaceutical arithmetic.

The foremost conclusion, which is no surprise, is that the trouble students have in learning pharmaceutical arithmetic lies, for the most part, in the "arithmetic," not in the "pharmaceutical" part. In other words, if a student has the ability to reason arithmetically, knows his arithmetical concepts, and is proficient in arithmetical skills, he should have little or no difficulty with pharmaceutical arithmetic.

Probably everyone who has had some experience in teaching some type of mathematics to a group of college freshmen has been struck by the fact that many of them seem to know so little about what is termed "arithmetical concepts and skills." When one finds this situation, the natural reaction is to look askance at elementary and secondary school teachers and blame them for this seemingly unjustified weakness. Actually, this situation is not a result of poor teaching at the elementary or secondary school level. To illustrate, let us consider the results of a study conducted with a group of New Jersey students who were tested on their proficiency in arithmetic computation and arithmetic reasoning as they progressed through the grades.

Computation in this instance refers to the facility of using arithmetical skills with speed and accuracy, while reasoning refers to working out a problem using arithmetical concepts. Before presenting the results of this study, I wish to state that three things should be remembered: First, this was a group of better-than-average students; secondly, the entire group took four years of secondary school mathematics; and, last, the teachers were exceptionally capable. Now, if the results of the tests on arithmetic computation were roughly represented, we would have that which is represented in Figure 1.

It will be noted that the students reached their maximum proficiency in computation at the eighth grade level; then, a gradual decrease took place through the four years of secondary school. This indicates that while the students were studying arithmetic, they maintained their skills and became more proficient; but when they studied mathematics that did not require a great deal of computation, they began to lose their proficiency.

If we were to consider an average group of students who did not have four years of secondary school mathematics and did not have exceptional mathematics teachers, it would be reasonable to expect that the dotted

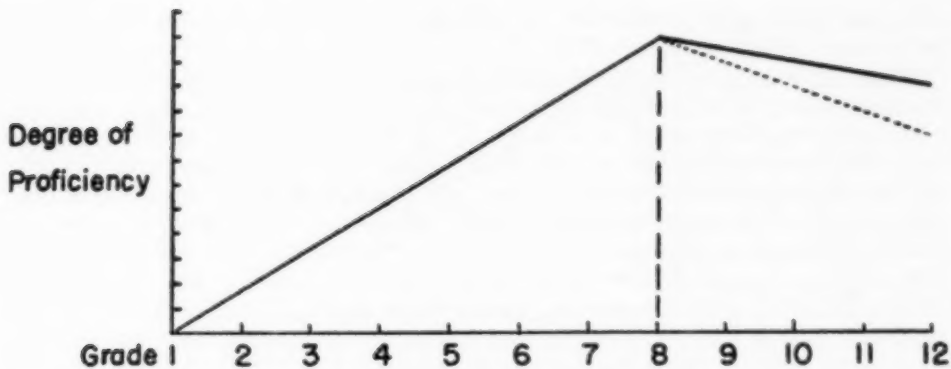


FIG. 1 ARITHMETIC COMPUTATION

line in Figure 1 would represent the picture of their proficiency in arithmetical skills. There is more truth than slander in the statement that the average college freshman is no better than a sixth grader when it comes to arithmetic computation.

In contrast to the decrease in computational proficiency, there was no decrease in proficiency of reasoning in the same group of New Jersey students. Again, roughly representing the results, we have that which is represented in Figure 2.

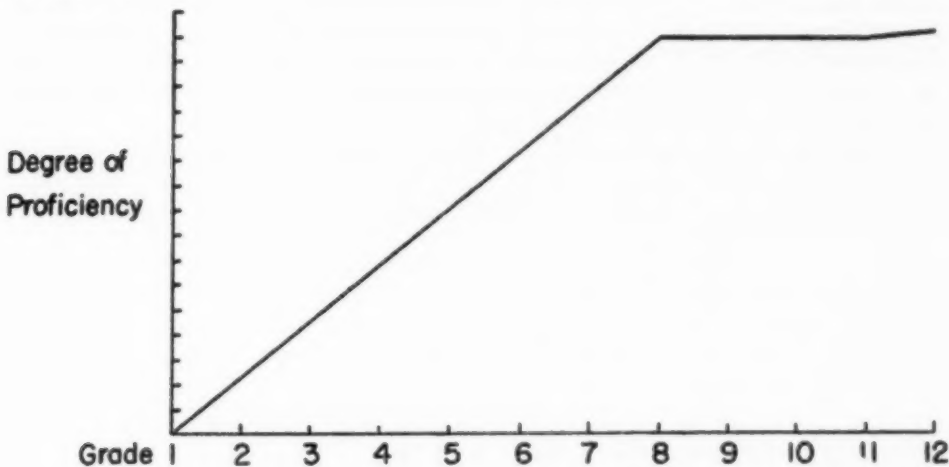


FIG. 2 ARITHMETIC REASONING

Although a plateau is reached in the eighth grade, there is an indication that by the twelfth grade, an increase takes place. In secondary school mathematics, the student learns to apply the concepts he has already learned to new situations; and he also learns new, nonarithmetical concepts in geometry. The fourth year of mathematics in this school was a special introductory course in college mathematics which, among other things, gave the students more of an insight into arithmetic concepts. Since the average student does not have that amount or type of secondary school mathematics, however, it would be reasonable to assume

that some decrease in proficiency of reasoning would occur, but not as much as the decrease in proficiency of skills.

Since the successful study of pharmaceutical arithmetic requires that the individual have at least as much as, if not more than, the eighth grade level of computation and reasoning, it is necessary to teach some arithmetical concepts and skills at the college level. There are some who are greatly disturbed by this fact because they tend to regard anything arithmetical as definitely below the college level. This is not a realistic approach, for the meaning of number and number relationship only comes gradually as the individual gains insight into the fundamental assumptions and laws that govern mathematics. The time needed to accomplish this depends upon the ability of the individual, the opportunity the individual has to use the concepts and skills he has learned, and the type of teaching he receives which enables him to build on what he already knows.

Now, when arithmetical concepts and skills are taught at the college level, they should certainly not be taught in the same manner as they are in the elementary school. College students are mature enough and have sufficient grounding in the subject to be taught in a much more sophisticated manner. As a result, the basic fundamentals can be understood by the students, enabling them to deal with the applications of these principles in a relatively short time. The only way I know to show what I mean is to present some examples of basic arithmetic from a more sophisticated point of view than is usually used at the secondary or elementary school levels. Before doing this, however, it should be made clear that a lot of this is not new; but, perhaps, by going over it again, a new insight into arithmetic will be gained. Also, it should be noted that many schools of education devote a full year, or at least a semester, to a course entitled, "the teaching of arithmetic." Therefore, at this time we cannot do more than scratch the surface. With these qualifications in mind, here are some mature approaches to some of the fundamentals of arithmetic.

Consider, for example, the number, 245.67. If a group of college freshmen were asked what this number actually stands for in terms of our number system, the following might be obtained after some prompting:

$$\begin{array}{rcl} 200 & = & 2(100) \\ 40 & = & 4(10) \\ 5 & = & 5(1) \\ .6 & = & 6(1/10) \\ .07 & = & 7(1/100) \end{array}$$

$$245.67 = 2(100) + 4(10) + 5(1) + 6(1/10) + 7(1/100)$$

How many would convert this into the following:

$$245.67 = 2(10)^2 + 4(10)^1 + 5(10)^0 + 6(10)^{-1} + 7(10)^{-2}$$

Once the student begins to realize that all numbers are simply a means of representing quantities in a number system with the base ten, a great deal will be accomplished, and the student will be on his way to true number understanding.

In teaching the first year mathematics course at Rutgers, I used the following example quite often. At the first or second meeting of the course, I would ask the students what the following are equal to:

- (1) $3/0 = ?$
- (2) $a/0 = ?$, where "a" is any positive integer
- (3) $0/0 = ?$

Invariably, the answer for (1) would be "0." When the students thought about (2), they were not quite as sure as they were with (1); but, again, the answer would be "0." However, when they got to (3), their faith in their knowledge of division would begin to falter; but, bolstering their courage, they would either state that the answer is "1" or "0." Then, I would ask, "Are you sure of your answers?" This would be followed by more discussion and arguments than could be found in a debating society. Finally, the class would realize that they had never divided anything by zero before, which would be the opening for me to state that division by zero is not defined in mathematics. This would lead into the discussion of the importance of defined terms, assumptions, and proof in mathematics. After this sank in, they were no more disturbed by the fact that you cannot divide by zero than they were by the fact that you cannot hit a home run in a football game.

Here is another example of where misunderstanding exists regarding the basic operation of division. Suppose a group of new college students were asked what the following are equal to:

$$(1) 2/5 = ? \quad (2) 3/4 = ? \quad (3) 2/3 = ?$$

If the students did not possess predetermined ideas of what these three are equal to, they would obtain the values by dividing the numerator of each fraction by the denominator and would obtain:

$$(1) 2/5 = .4 \quad (2) 3/4 = .75 \quad (3) 2/3 = .66$$

However, division is defined in the following way: If $a/b = c$, then $bc = a$. If we apply this to the results, we find that $5(.4) = 2$, $4(.75) = 3$, but $3(.66)$ does not equal 2. When students see that .66 is not equal to $2/3$, they might say that the division was not carried out far enough. However, it can be easily shown that .666 or .6666, which are the results of carrying out the division one or two more places, still would not give 2 when multiplied by 3. Undoubtedly, someone will state that since .66 or .666 are very close to $2/3$, we could state that they are equal. The answer would be, "No, you could not; but it is a good approximation of $2/3$." This would then lead to a discussion of equivalents and approximates, which would greatly assist any pharmacy student who must use them and who very often depends on mathematics textbooks that confuse the two and unwittingly encourage inaccurate and false thinking.

Keeping to this example, we can demonstrate another thing that students do not fully grasp—the meaning of $2/3$. Usually, after some discussion, the students will agree that, among other things, $2/3$ represents 2 divided by 3. However, it can be quickly pointed out that it is not possible to divide 2 by 3, since no number can be arrived at which multiplied by 3 will result in 2. Hence, $2/3$ is simply the *expressed* division of two numbers. Similarly, a/b , any fraction, is expressed division of two numbers. In some instances, the division can be performed; while in others, it cannot.

Now that we have defined "fractions," it is quite logical to discuss ratios, showing that a ratio is the numerical comparison of the dimensions of two quantities. These dimensions might be number, length, size, weight, strength, etc.; but the same dimension must be used in forming the ratio. For example, we might have ratios of number to number, weight to weight, or strength to strength. It should be pointed out, however, that ratios are handled mathematically like fractions; therefore, they are fractions in arithmetic computation. The use of the following should be discouraged: $a:b$; and a/b should be used instead. There is no need to introduce new symbols which might confuse the students.

Continuing with fractions, the next important principle to be introduced is the operations that can be performed on fractions without changing their values. When students are asked what $2/3$ is equal to, if not equal to .66, they will probably answer, "4/6, 6/9, 8/12, etc." With a little analysis and experimentation, the student can be made to realize that the only thing that can be done to a fraction without changing its value is to multiply the numerator and denominator by the same quantity. This, in turn, leads to the general principle that if a/b is any fraction, then the value will not be changed by multiplying the numerator and the denominator by the same number, c , whether c be an integer or fraction; thus, $ac/bc = a/b$. Since c can be a fraction or an integer, division of the numerator and denominator of a fraction by the same quantity can be accomplished by multiplying numerator and denominator by a fraction (i.e., division by 2 is accomplished by multiplication by $1/2$).

It can next be shown that fractions and decimals differ only in that a decimal is a fraction represented in the following way: $3/4 = 3(25)/4(25) = 75/100 = 75(1/100)/100(1/100) = .75$. Since not all denominators of fractions can be converted into a power of 10 (i.e., 10, 100, 1000, etc.), not all fractions have an equivalent decimal representation.

The next extremely important concept of fractions is that when we take $2/3$ of a quantity, we imply that the quantity is divided into three equal parts and that two of these parts are being considered. Therefore, a/b represents dividing the quantity into b parts and considering a of these parts. When a student adds $2/3$ and $1/2$ and gets $2/3 + 1/2 = 3/5$, he is forgetting this concept. The student must be convinced that he can no more add halves and thirds and get fifths than he can add apples and peaches and get bananas; and that the only way addition or subtraction can be accomplished is to convert the components into like units. This is not done by any fancy rules, but simply by reverting to what was discussed about fractions. The student must convert the denominators into like units, and he will realize that if he multiplies the first by 2, he obtains 6; and that if he multiplies the second by 3, he also obtains 6; but he must remember that if multiplication is performed on the denominator it must also be performed on the numerator; hence, $2(2)/3(2) + 1(3)/2(3) = 4/6 + 3/6 = 7/6$. Students are usually confused when multiplication and division of fractions are compared with addition and subtraction of fractions; for example, when $2/3$ is multiplied by $1/2$, the numerators and denominators are multiplied together, $2/3 \times 1/2 = 2/6$ without need for a common denominator. To explain this, it must be pointed out to the student that multiplication differs from addition by showing him that we can multiply a fraction by 2 by either doubling the numerator or halving the denominator, and the reverse is true when dividing by 2. Gradually, we can lead him to the realization that, $c a/b = ac/b = a/b/c$ and $1/d a/b = a/bd = a/d/b$, and finally, $a/b c/d = ac/bd = a/d/b/c$. In other words, the student looks on the multiplication of $1/2$ by $2/3$ as $1/2$ multiplied by 2 and $1/3$ or $1/2$ multiplied by 2 and divided by 3. When he does this, he will see no need for common denominators in multiplication or division.

If, in the multiplication of fractions, the same factor appears in the numerator and denominator, they cancel out each other's effect on the final answer. From this rises the term, "cancellation." I am sure that we have all known students who were "cancellation happy"; and, on the slightest provocation, would strike out similar terms regardless of the context in which they appeared, getting erroneous and unique results. I have always discouraged the use of the term

"cancellation" in my classes, preferring that students state that one factor divides into an equivalent factor with a quotient of 1. This takes longer to say, but it does a lot to cure the cancellation fever.

Division of fractions seems like black magic to some students, for all that they remember is the magical phrase, "invert and multiply." However, if division of fractions is approached in the following way, there should be little difficulty. Consider the example of $\frac{3}{4}$ divided by $\frac{4}{5}$, which is set up as follows. $\frac{3}{4} \div \frac{4}{5}$: Here, we have a fraction in the form of a/b , where $a = \frac{3}{4}$ and $b = \frac{4}{5}$. Realizing that when $\frac{4}{5}$ is multiplied by $\frac{5}{4}$, the reciprocal, the result is 1, the student can proceed to do this; but he must remember that since this is a fraction he must multiply the numerator by the same quantity; hence:

$$\frac{3}{4} \div \frac{4}{5} = \frac{3}{4} \times \frac{5}{4} = \frac{15}{16}.$$

The more the student is required to use the basic concepts of arithmetic and the less he relies on manufactured rules, the greater is the chance that he will develop the proper approach to any problem involving calculations.

Speaking of manufactured rules, there are probably more supposedly short-cut rules applied to simple equations and proportions than to anything else. A proportion is an expressed equality between two ratios or fractions, and, as such, is an equation. Expressed equality means that although it is stated that the left-hand member equals the right, this is not always the case, a point which students are very likely to forget.

Everyone has heard the rule, "The product of the means equals the product of the extremes." It is my personal belief that we have a printer or typesetter to thank for that one. Consider the proportion, a over $b = c$ over d . One would have to stretch his imagination somewhat to decide which is "mean" and which is "extreme"; but, when the typesetter decided that this took up too much space, he set it up this way: $a/b = c/d$, and this became, $a \div b = c \div d$, and finally, the colon (:) replaced the division sign (\div) and it became, $a:b :: c:d$. Thus we finally ended with means and extremes. In this case, the equal sign and standard indication for expressed division were victims of the economy of printing. Unfortunately, at the same time, the basic idea that a proportion is an equation was also a victim.

The best approach to proportions is to use the $a/b = c/d$, maintaining the idea of an equation, forgetting about the rules, and going back to the basic axioms of mathematics on equality, which are:

1. Equals added to equals give equals.
2. Equals subtracted from equals give equals.
3. Equals multiplied by equals give equals.
4. Equals divided by equals give equals.

The student can then derive rather than memorize all of the laws of proportions. Here are a few using the multiplication axiom:

- (1) $b \cdot a/b = b \cdot c/d$, which results in $a = bc/d$
- (2) $d \cdot a/b = d \cdot c/d$, which results in $ad/b = c$
- (3) $bd \cdot a/b = bd \cdot c/d$, which results in $ad = bc$

The "means and extremes" rule, as well as the term "cross multiplication" (another rule that causes more trouble than it is worth) comes from (3). Some students think that the two fundamental laws of mathematics are "cancellation" and "cross multiplication."

Generally speaking, although it may be of some quick assistance to teach students rules rather than principles, in the long run it is a waste of time. If we start with the idea of teaching for meaning rather than for speed, the speed will come; however, the reverse is not true.

I remember the student who, when asked to solve the simple equation, $x + 2 = 5$, said, "You take the 2 and carry it across the bridge, change the sign and add it to the 5." I could not help thinking of him going home and telling his mother that he had a hard day in mathematics class carrying numbers across the bridge. I hope that I have not made mathematics appear that tedious; and some light has been shed on how arithmetical concepts can be taught at the college level.

I think we must drop our somewhat insular point of view and develop instead a generally broader concept of pharmacy, acquire a better understanding of its ramifications and scope, and within this enlarged horizon integrate the educational process into pharmaceutical endeavor wherever it may be found, within the whole range of activity, from the crude raw materials to the physician's prescription and dosage forms.

H. Evert Kendig, *Am. J. Pharm. Ed.*, 5, 459 (1941)

SOME EXPERIENCES WITH PREPARATIONS, TECHNOLOGY, AND PHYSICAL PHARMACY IN AN INTEGRATED COURSE

ARNOLD D. MARCUS

During the past few years there has been extensive discussion concerning the objectives, character, and standards for those areas best known as pharmaceutical preparations, pharmaceutical technology, and physical pharmacy. In the course of these discussions particular controversy has centered around the desirability of integrating these subjects, but the greatest differences of opinion have resulted from proposals relative to integration of the physical pharmacy content.

Despite the divergent and varied views expressed, there has been virtually unanimous agreement that every effort should be made to raise the academic level of pharmacy courses. More specifically, it has been agreed that this elevation of academic level could best be accomplished by making the fullest possible use of the students' basic science background.

As a result of these viewpoints and because of the curricular framework at Rutgers University, an attempt was made to integrate the three areas into a single, two semester, junior year pharmacy course. It was our general feeling that inclusion of physical pharmacy content would be instrumental in replacing much empirical and qualitative material with quantitative relationships having a sound theoretical foundation. A brief syllabus outlining the approach used to achieve these ends is appended hereto.

Since a possible objection to the procedure used and the subject matter considered may be that the students possess insufficient background to comprehend the concepts involved, it would be well to note the basic science training of the students enrolled in this integrated course. Their previous training included: general chemistry, qualitative analysis, quantitative analysis, organic chemistry, physics, fundamentals of calculus, principles of pharmacy, inorganic pharmaceutical chemistry, pharmaceutical calculations, and general biology. There can be little question that such training is more than adequate for the achievement desired.

What, then, were the results of this attempt at integration? In general, integration of preparations with technology met with excellent results. The students appeared to gain an understanding of formulation problems, they were able to intelligently criticize official formulae and procedures, and demonstrated the ability to accurately interpret journal articles concerning pharmaceutical formulation. Unfortunately, however, the attempt to integrate physical pharmacy was much less successful. The attempted integration resulted too often in emasculation of the physical pharmacy content and, at other times, in obfuscation of class objectives. In essence, the benefits accruing to preparations and technology were more than offset by the sacrifice in physical pharmacy.

Naturally the decreased time available in the integrated program contributed to the lack of success. Factors such as student attitude, manner of presentation, laboratory-lecture coordination, and relative difficulty of the subject matter were also significant. It is, however, the contention of this paper that more subtle aspects of the integrated program played the decisive roles. Both the purpose of physical pharmacy in the curriculum and the great difference in emphasis

between physical pharmacy and preparations or technology seem responsible for the partial failure.

A prime objective of virtually all college courses, including pharmacy courses, is the development of student ability to apply general principles to specific situations. The subject matter ordinarily considered in preparations and what the author believes to constitute technology differ, however, to a considerable degree from that studied in physical pharmacy. Preparations and technology must, if they are to meet generally accepted objectives, deal largely, though certainly not entirely, with material which is highly specific, individual, and factual in character. In short, a substantial portion of the subject matter does not permit the application of generalities. Immediately obvious examples in support of this contention are synonyms, doses, uses, ingredients, and rubrics. Such information is, nevertheless, important to the pharmacist. There are also other areas of specificity and individuality much less obvious though equally important.

In contrast to preparations and technology, physical pharmacy's main concern is general principles and quantitative relationships. This contrast in character as well as the comparatively abstract nature of physical pharmacy leads to a difficult learning situation. When an attempt is made to integrate preparations and/or technology with physical pharmacy there is too often an abrupt change in the frame of reference and the type of thinking required. Such abrupt changes do not permit the most efficient learning. Integration may, and has, in addition, led to an obscuring of initial objectives and purposes.

The following examples, taken from actual experience, may serve to illustrate the contention raised. During a discussion of nonaqueous nasal preparations, the discussion turned to tonicity requirements or lack of such requirements. Though the answers seem obvious, the discussion raised numerous questions which could be answered satisfactorily only by entering into concepts including: Raoult's Law, colligative properties of solutions, Donnan equilibria, activity concepts, and partition coefficients. By the time a satisfactory foundation had been established, the original objective—nonaqueous sprays—had been all but forgotten. If these fundamentals had been a part of previous education, a brief reference or refreshment might well have sufficed.

Upon another occasion the lecture material was directed towards the use of nonionic surface active agents to "solubilize" oils in the manufacture of elixirs and aromatic waters. The initial objective was to point out that although these agents are apparently very satisfactory, their employment is associated with serious drawbacks. Prior to this, however, the mechanism of solubilization required consideration. As a result of this need, a rather substantial amount of time and effort was devoted to surface tension, positive adsorption at an interface, and micelle formation. Once more, the pursuit of the original intention was hindered. In the same discussion, however, an explanation of oil "solubility" in micelles was a simple matter because the fundamentals of molecular interaction and solubility phenomena had been considered much earlier and in detail.

The value of a sound fundamental background *prior* to preparations and technology may be seen from the following experience. During one class period we were attempting to compare and differentiate syrups and elixirs as general dosage forms. One of the bases of differentiation concerned the higher alcohol content of elixirs. It was, however, necessary to exempt the bromide elixirs. Since the initial portion of the course had considered solvent-solute interaction,

Coulomb's law, and the role of dielectric constants, only a brief reference along with a few pertinent questions were required to establish the theoretical point and practical consequence.

On still another occasion the topic under consideration dealt with the stability of solutions and injections. Because of the lack of time and a fear on the part of the author that the class would lose sight of the true objectives of the discussion, the entire concept of stability was developed in a purely descriptive fashion. The students would, however, have gained a much better understanding of the problems involved if they had been considered from a chemical kinetic basis. In this instance the attempt at integration necessitated the elimination of an important topic.

It may be said that separation, to a substantial degree, of the theoretical and applied areas, as shown in the appended syllabus, will serve the same end as a separate course in physical pharmacy. Such an argument does not consider the time available. There is an obvious difficulty in attempting to condense a three credit, one semester course in physical pharmacy into six, eight, or ten weeks. What is more important, such proposals overlook basic learning situations. That is, a course devoted essentially to abstract principles and general laws requires a type of thinking and an attitude quite different from a course which is essentially applied and factual. Lest it be said that such separation would remove much of the motivation, it would be well to point out that pertinent pharmaceutical examples could be used to illustrate generalizations. It would be equally well to point out that pharmaceutical systems are quite complex in character and consideration of complex systems must follow basic treatment of simple systems. It would, for example, be folly to consider van der Waals' equation of state prior to the ideal gas law.

While it appears that the above presentation implicitly assumes that pharmaceutical preparations are to be considered from the "dosage form" point of view, the pertinency of the objections to integrating physical pharmacy holds for the "main chemical constituent" approach as well.

As a result of the emphasis in the preceding discussion on sound fundamental training, some may say that a course in physical chemistry would be preferable to the physical pharmacy course. Though the author admits that physical chemistry should *ideally* precede physical pharmacy, it cannot substitute for it. The areas of emphasis and the objectives of these two courses are sufficiently different that the substitution would be impractical. Many of the topics most important in physical pharmacy are either omitted entirely or treated scantily in elementary physical chemistry.

In summary, then, pharmaceutical preparations and pharmaceutical technology can apparently be integrated into a single course without sacrificing the quality of either. There are, in fact, definite advantages to be gained. Integration of physical pharmacy with these two areas leads to pronounced elevation of the character of preparations and technology but results in a decrease in the quality and quantity of physical pharmacy content. In addition, the wide divergence in the types of material emphasized may result in a poor learning situation and a definite obscuring of intended objectives.

In light of the experiences related and the conclusions stated, it seems that physical pharmacy could be exploited most efficiently by being included as a separate subject. It should precede the preparations technology course of sequence. Even though this recommendation represents a departure from the

capstone role originally assigned to physical pharmacy (1), the author's experience with both the separate and integrated offerings supports the above proposal.

It does not appear likely that such implementation is feasible under the four year program. When, however, the expanded curriculum goes into effect, such a sequence would be not only feasible, but logical. There would be little if any encroaching upon humanities, and the over-all pharmacy sequence would be considerably benefited.

REFERENCES

- (1) Busse, L. W., *Am. J. Pharm. Ed.*, 15, 66 (1951).

SYLLABUS

PART I

- I. Interatomic interaction
- II. Intermolecular interaction
 - A. Solids
 - B. Liquids
 - C. Gases
 - D. Complexion
 - E. Solubility phenomena

PART II

- I. Homogeneous systems-simple
 - A. Waters
 - B. Syrups
 - C. Elixirs
 - D. Solutions
 - 1. pH and the solubility of weak acids and bases.
 - 2. Instability constants
 - 3. Hydrolytic and oxidative decomposition
 - E. Injections
 - F. Spirits
 - G. Sprays
- II. Homogeneous systems-Complex
 - A. Theory of extraction and diffusion
 - B. Physical chemistry of plant constituents
 - C. Tinctures
 - D. Fluidextracts
 - E. Others

PART III

- I. Heterogeneous systems
 - A. The colloidal state
 - B. Surface chemistry
 - 1. Adsorption isotherms
 - C. Emulsions as colloidal systems
 - 1. Theories of emulsification
 - 2. Stability of emulsions
 - 3. Phase volume ratio
 - 4. Suspending media
 - a. Stokes law
 - D. Lotions
 - E. Mixtures
 - F. Magmas
 - G. Gels
 - H. Emulsions
 - I. Ointments
 - J. Pastes
- II. Solid dosage forms
 - A. Physics of tablet compression
 - B. Tablets
 - C. Capsules
 - D. Powders
 - E. Miscellaneous

PART IV

- I. Summary and comparison of dosage forms

There is no reason why pharmaceutical education should not supply the total brain power needed by drugdom; in fact, as an integral part thereof it is its duty to do so.

H. Evert Kendig, *Am. J. Pharm. Ed.*, 5, 444 (1941)

CHEMISTRY IN THE FIVE YEAR PROGRAM— THE GRADUATE PROGRAM *

GEORGE HAGER

Plans for the further instruction of the graduates of a five year pharmacy curriculum should logically be based on the merits and shortcomings of a four year program, recognized through experience with students entering a graduate school after completion of such a program, and on the extent to which the inadequacies of the latter will be corrected in the five year curriculum as far as preparation for graduate study is concerned. The advantages of a five year program in the training of the clinical or dispensing pharmacists, who constitute a majority of pharmacy personnel, appear to have outweighed certain disadvantages, and a five year program becomes prerequisite for accreditation in 1960. It is sincerely to be hoped that those who have been convinced against their will are not of their original opinions still. The influence of the five year program on the training of the minor segment of pharmacy personnel—teachers, researchers in the pharmaceutical sciences, etc.—for whom advanced study at the graduate level becomes an important qualification, is more difficult to evaluate and has not been predicted with the same measure of confidence.

One effect of the five year program on graduate study in colleges of pharmacy which may be anticipated is a decreased number of applications from graduates of the five year program; and this situation may be expected to deteriorate still further if the efforts of proponents of a higher degree or a "higher-sounding" degree prevail. In the mind of the five year graduate, the difference between "Phar.D." and "Ph.D." is a trivial one, and either degree serves to remove the hypocritical stigma of the traditional "Doc." One of the most important objectives of the major professor of a graduate student is the metamorphosis of pride in scholastic achievement and academic recognition beyond that of fellow students into thirst for knowledge—of the subjective satisfaction with grades, awards, and degrees into an objective zeal to create new knowledge and humility in face of what still remains to be learned. Will the graduate of the five year program be adaptable to such a metamorphosis? Will his ego be satisfied with what he has learned and the degree which testifies to his learning, or will his intellectual appetite be whetted for higher learning even though a "Phar.D." is practically as good as a "Ph.D." as a ticket to prestige, higher salary, and shorter working hours? If the five year graduate refuses to stoop to the freshman level of graduate work, if he is reluctant to endure additional years of long hours at desk and bench, and if he is not willing to submit to the austerity and disciplines of scholarly pursuits of awards of greater value altruistically than socially or economically, then who will populate the graduate departments of pharmacy schools, assist in laboratories, conduct and publish research, qualify as teachers, etc.? Is there a possibility that the minority of the pharmacy profession which contributes the pharmaceutical literature, conducts research on drugs, manufactures them, etc. will consist in still larger measure of persons who are not trained in colleges of pharmacy, nor schooled in the traditions of the profession?

"It is the responsibility of the college of pharmacy to ensure that the under-

* Presented to the Section of Teachers of Chemistry, AACP, Miami Beach, Florida, 1955.

graduate curriculum requires or includes sufficient basic sciences so that the professional graduate is under no handicap upon admission to a graduate school" (1). If the five year program is so designed that it consists of two years of genuine liberal arts training, and if the administration of graduate schools can be convinced that the remaining three years are equivalent to at least two more years of liberal arts training as far as admission requirements are concerned, then, from this standpoint, the graduate program in colleges of pharmacy should benefit from the new curriculum. The dean of one of the graduate schools was asked for his opinion about the length of time required for the M.S. and Ph.D. programs in the case of a graduate of a five or six year pharmacy curriculum. He answered in all seriousness that he did not see any reason for longer graduate programs provided the proposed five or six year program qualified the student for admission to the graduate school. Some pharmaceutical educators may be maintaining a false hope if they expect the graduate schools to be eager to cooperate in plans for granting a graduate degree such as the M.S. in recognition of scholastic achievements made for the most part in an undergraduate professional program. Package deals of this type have, of course, been tried before and found unacceptable: for example, the combined pharmacy and premedical curriculum. The fruitful relationship between a graduate student and his major professor cannot be defined by syllabi nor accredited in grade letters and semester hours. The five year program should be considered not from the standpoint of its modification of the graduate program, but only from the standpoint of its qualification of students to enter the graduate program.

Will the graduate of the five year program be better qualified to enter a graduate program leading to a higher degree in pharmaceutical chemistry? The varied experiences of different teachers with graduates of the four year curriculum would no doubt elicit quantitatively different answers to this question; but the all-or-none consensus would certainly be in the affirmative. It is to be expected that a graduate of a five year program, like the graduate of the usual four year program, will have completed the basic courses in inorganic, organic, analytical, and medicinal chemistry. It is to be hoped that he will have completed a bona fide course in physics, and, if not physical chemistry as well, at least mathematics through analytical geometry and calculus. The graduate of the four year curriculum sometimes must devote part of his first year correcting deficiencies in physics and mathematics, thus deferring physical chemistry until his second year and hence requiring two years for the master's degree. Moreover, he does not have the benefit of his physical chemistry course in the conduct of his research for the master's degree. Language deficiencies should be less obvious in the graduate of a five year program provided his choice of electives has been intelligently guided. Such deficiencies are quite apparent in the graduates of a four year curriculum, and have reached the ridiculous extreme where it became necessary to discuss the use of Beilstein with a Chinese student in the French language. The emphasis on biological sciences in the five year program should provide prerequisites for pharmacology at the graduate level, a decided advantage in view of the deficiencies often encountered in the graduate of the four year program and for courses in vertebrate zoology, physiology, and basic pharmacology laboratory. Incidentally it may be pointed out that a pharmaceutical chemistry major is misbranded who is not carrying a strong minor in pharmacology. Such a statement could, of course, precipitate a discussion of just what pharmaceutical chemistry is. Although such a discussion does not

fall within the purview of this topic, a definition of terms appears necessary. For present purposes, pharmaceutical chemistry is a combination of the disciplines through the exercise of which an individual is capable of synthesizing and analyzing substances for medicinal purposes, with those disciplines which enable him to decide what substances should be synthesized and analyzed for medicinal purposes. Hence a pharmaceutical chemist is not an organic chemist, a pharmacologist, or a pharmaceutical technologist, but rather a hybrid appreciative of the problems faced by each of his "purer" colleagues. One less tangible factor in the pregraduate training of a five year man is the personal influence of his instructors. Their attitude and enthusiasm, even more than their pedagogy, may inspire in the best students a thirst for more knowledge, leaving them discontent with the many rights and privileges appertaining to whatever undergraduate degree will eventually be granted on successful completion of the five year curriculum.

The answer to the second big question may be found in part in the personal influence of an inspired faculty on the attitude of the graduate. *Will the graduate of a five year program be inclined to undertake graduate study leading to a higher degree in pharmaceutical chemistry?* Drs. Blauch and Webster (2) indicate their awareness of faculty influence on future professional growth as far as this applies to the pharmaceutical clinician by stating "... the college of pharmacy should foster in its students a desire for continued professional study after graduation. This desire is not likely to be achieved by any special course in the curriculum, nor by any one particular thing that is done. Rather it results from a combination of efforts and circumstances, such as providing a good foundation in science and scientific method, stimulating a spirit of scientific inquiry, teaching the student to rely on himself and his own efforts to solve his problems and putting in his possession the means therefore, suggesting and promoting wide reading in professional literature, encouraging a critical attitude, and pointing out to the student the unsolved problems of pharmacy and what may be anticipated in the future in the attempts to deal with them. Both the subject matter and the methods that are employed in teaching play a role in the accomplishments of this purpose. An atmosphere of study and research, inspiring teachers, and freedom from the vitiating influence of static ideas also have a place in promoting this aim." On the same subject, Henry Adams has this to say: "Nothing in education is so astonishing as the amount of ignorance it accumulates in the form of inert facts." If the effect of the personal influence of an inspired faculty over the longer period of five years be discounted, the conclusion that the five year graduate would be less inclined to enter a graduate school seems justified on the basis previously discussed. Hence the faculties of the colleges of pharmacy are faced with the challenge of influencing the better-trained, more mature, and probably more resistant graduates of the five year program to undertake graduate study at considerable self-sacrifice without the superficial incentives of better jobs, better pay, or more prestige in the future than would be immediately available to them as five year graduates. The faculties of schools of pharmacy are faced with the necessity of making their graduate programs as appealing to the five year graduate as they are to the nonprofessional graduate. Drugstore practice, honorable and important as it may be, is only half a loaf for the individual capable of engaging in the teaching, research, and manufacturing phases of the profession. Faculties in schools of pharmacy have definite responsibilities in the guidance of such individuals; and the diligence of the faculties in discharging these responsibilities will determine in large measure whether the constant attrition of

the pharmacist's professional prerogatives will eventually confine his sphere of influence to a prescription counter in some supermarket or department store, or whether his position among public health servants will be restored, consolidated, and expanded in a manner commensurate with his traditions and his potentialities.

REFERENCES

- (1) Blauch, L. W., and G. L. Webster, *The Pharmaceutical Curriculum*, American Council on Education, 1952, p. 60.
- (2) *Ibid.*, p. 62.

It stands to reason that pharmacy cannot expect a position of parity with its colleagues in the other health professions, nor can it rightfully demand or assume a full share of responsibility in public health regulation and control, without an educational preparation adequate for the exacting requirements, and inferior to none.

H. Evert Kendig, *Am. J. Pharm. Ed.*, 5, 455 (1941)

INTEGRATION OF BASIC PHARMACY COURSES WITH DISPENSING *

JOSEPH B. SPROWLS

Of all the courses in the typical college of pharmacy curriculum the one which comes nearest to duplicating the special work of the practicing pharmacist is that of dispensing pharmacy. Realizing that no portion of the curriculum can be called unimportant and that it is impossible to measure accurately the contribution of any specific course to the ultimate capability of the graduate pharmacist, it is, nevertheless, probable that dispensing pharmacy is the one course which is specifically designed to train the pharmacy student for the type of work which will be his major contribution to society. So important is the dispensing course, in fact, that other courses in the pharmacy curriculum are often described as "essential" on the basis that they are fundamental to its proper presentation.

The point I wish to make is that dispensing pharmacy is the focal point of the entire pharmacy curriculum, and the curriculum is so designed that it builds toward this ultimate focus. In the ideal, we build a solid foundation of physical and biological sciences, pharmaceutical technology, law, and mathematics so that the student will be thoroughly competent to understand and solve the most difficult problems with which he will be confronted in the final course in dispensing. In the ideal, also, we confront him with difficult problems to solve so that he will be graduated with sufficient experience and confidence to perform similar operations in the practice of his profession. The question which is in my mind, however, is whether we have come anywhere near to accomplishing the ideal. That we have built the foundation I do not question. That we have the capstone course in dispensing pharmacy I do not question. But to what extent have we integrated the two? Have we cemented the capstone to the foundation in such a way that the entire structure gathers support and strength from the union?

We have made great strides in recent years in improving the level of instruction in the fundamental pharmacy courses. This has come about largely as a result of the inclusion of sufficient basic science courses in the curriculum, which in turn permits a more theoretical approach in the technological courses. We have seen the introduction into the pharmacy department of such courses as physical pharmacy and pharmaceutical technology, which, under whatever name they may be given, are concerned with the application of basic physical and chemical concepts to the development of pharmaceutical technics and the solution of pharmaceutical problems. In some schools, if not all, this phase of instruction has been advanced to a rather high level; but I question whether the instruction in dispensing has kept pace with the change in other courses. I have some fear that the students coming into dispensing immediately after completing the basic courses may be disillusioned by encountering in this most important course a sophomoric level of instruction. One of the methods by which any such disillusionment may be avoided is the complete integration of the course in dispensing with earlier portions of the curriculum.

An even more important reason for integrating the dispensing course is that of making the teaching more efficient and more effective. The process of education is in part a matter of training our thought patterns so that we more readily associate related bits of information. A high degree of performance is closely related to our ability to utilize bits of knowledge which have been related

* Presented to the Section of Teachers of Pharmacy, AACP, Miami Beach, Florida, 1955.

through the memory process. Thus, it is important that the teacher help his students to associate in every way possible the facts and principles which are to be learned. I am sure that each of us will recognize through our own educational experience that integration of ideas in the classroom is very closely related to association of the same concepts within the memory process.

For the purpose of this discussion it will be assumed that the following courses are prerequisite to the course in dispensing pharmacy, and have been completed or are in the process of being completed at the time when the course in dispensing is given:

Inorganic, organic, and analytical chemistry
Biology, physiology, pharmacognosy, and pharmacology
Mathematics and physics
General pharmacy, pharmacy of medicinal products, and pharmaceutical technology
Pharmacy law and pharmaceutical economics.

These, then, are the courses which may be drawn upon in the teaching of the dispensing course.

Because the possibilities of integration are almost without limit, the best which the author can do is to present representative examples. This will be done through the medium of a series of questions which will be posed with the answers partially anticipated.

1. Do we use prescriptions in our course which present the student with mathematical problems to be solved? If so, do we select problems which are a real challenge and which will require selection of measuring devices and special care in measurements. Do we require the student to give consideration to the probable accuracy of his results on the basis of his experiences in analytical chemistry? Finally, do we have the student analyze his or another student's products so that he will have real knowledge of the probable degree of error?
2. In teaching the compounding of lotions, liniments, and ointments, do we orient our discussions through a consideration of physical-chemical principles and the ultimate principles of application? Do we relate emulsion types to spreadability, absorbability, and consistency of ointment bases? Do we consider possible incompatibilities between drugs and emulsifying agents? Do we consider the physiological significance of pH in ointment bases?
3. In teaching the compounding of liquid prescriptions do we approach the subject in the light of fundamental considerations, or do we use the empirical approach? For example, in the teaching of isotonic solutions do we relate our discussions to the constant values for colligative properties and demand a thorough understanding of these principles before proceeding to the more direct methods for adjusting these solutions? Do we bring into our discussion a consideration of the physiology of the eye?
4. In the teaching of chemical incompatibilities do we generalize in terms of qualitative analysis or do we attempt to teach all incompatibility reactions as isolated facts? In reviewing the incompatibilities of aspirin, for example, do we relate them to the incompatibilities of phenol and of benzoic acid, or do we regard them as isolated phenomena which are peculiar to only one substance?

5. In the teaching of incompatibility correction do we consider such matters as decomposition kinetics and drug preservation, or do we teach the trial and error method?
6. Do we require the student to label his preparations accurately and in accordance with legal requirements, thus integrating his laboratory experience with the course in pharmacy law?
7. Do we require the student to price all prescriptions, thus giving him practice in the pricing methods which have been taught in economics courses?
8. Do we put the student "on his own" so that he must solve problems for himself in the light of his previous training?

These questions have been asked with a purpose. The instructor should ask these questions of himself, for unless these things are being done he is missing a great opportunity to integrate the material which he is trying to teach with some of the earlier educational experiences of the student. Individual drugs come and go, but fundamental principles seldom change. If we can teach the student how to relate fundamentals with which he is familiar to the compounding of prescriptions, we can prepare him for a lifetime of competent and confident public service.

The trend today is toward more and more cultural education. Only by such cultural education preliminary to a professional course can the young man be imbued with the ideals necessary to practice a profession as a profession should be practiced. One cannot establish these ideals in the crowded curriculum of a professional course.

Morris Fishbein, *Am. J. Pharm. Ed.*, 5, 466 (1941)

INSTRUMENTAL METHODS OF ANALYSIS

NATHAN LINDLEY MICHENER

The steadily increasing importance of instrumental methods in routine analytical chemistry and in research makes it a matter of prime importance that students of pharmaceutical chemistry be given some familiarity with these techniques. In the research laboratory complex optical and electronic instruments of high sensitivity and reliability are in everyday use. Physical or instrumental approaches to chemical analysis are proving themselves increasingly more rapid, reliable, and sensitive than the classical techniques. The general solution to the problem in the training of analytical chemists has been the establishment of a separate course in instrumental methods of analysis. The number and variety of techniques and instruments which must be included in such a course are gradually increasing.

GENERAL OBJECTIVES

A course in instrumental methods of analysis should produce chemists with insight into, and some experience with, the use of modern analytical instruments. It should turn out students who recognize the general characteristics of the methods with which they work, and who can draw on their own background with reasonable success for the intelligent operation and adaptation of present methods of instrumental analysis. It is important to consider what particular experiments will best demonstrate the general principles involved without losing the student in a complexity of operational details.

While it is generally agreed that a course in instrumental methods of analysis should be primarily a laboratory course, the fundamental principles involved in the construction and operation of the instruments used in the laboratory should be discussed in lecture periods. The student should get an idea of the types of instruments available, the theory behind their operation, the limitations and advantages of each instrument, and a brief summary of the application of instrumental methods of present-day problems of analysis. The operational details of the various instruments are left for the student to acquire in the laboratory. The student must develop sufficient technique of operation to enable him to obtain accurate, reliable, and reproducible results. Accurate interpretation and evaluation of the data are also an important part of the laboratory training of the student.

Students taking the course in instrumental methods of analysis should have an adequate background in physics and mathematics, and in the fundamental methods of chemical analysis. The course is designed for senior students and first year graduate students.

The availability of instruments is an important factor in determining the content and scope of the course in instrumental methods of analysis. New projects may be added from time to time as additional equipment becomes available. When the time arrives that the number of instruments available is more than adequate to meet the minimum requirements of the course, the students may be given some choice in selecting laboratory experiments, based on their individual interests. The experiments within a given unit of the course may be assigned in rotation so that each student may have an opportunity to perform all of the essential experiments in that unit by the time the unit is completed. This plan presents some difficulties in organizing lecture material, but, if the instruments requiring less technical explanation are assigned first, the laboratory experiments may be started satisfactorily without too much delay.

COURSE OUTLINE

1. Electrometric measurement of pH.
 - (a) pH of buffered solutions: pH 4 to pH 10.
 - (1) Relation between pH and millivolt readings on the potentiometer.
 - (b) pH of unknown buffered solution.
 - (c) pH of acetic acid solution, approximately N/10.
2. Electrometric titration.
 - (a) Change of pH during titration.
 - (b) Electrometric indication of end point of titration.
 - (c) Relation between molarity, pH, and degree of ionization of a weak acid.
 - (1) Calculation of ionization constant of a weak acid.
3. Electrometric titrations involving oxidation and reduction.
 - (a) Choice of proper electrode system.
 - (b) Oxidation potential.
4. Simple optical instruments.

Note: All of the instruments in this group are discussed in lecture. Each student selects one instrument of this group as the basis for a laboratory project.

 - (a) Colorimeter.
 - (b) Polarimeter.
 - (c) Nephelometer.
 - (d) Refractometer.
5. Complex optical instruments.
 - (a) Photoelectric colorimeter.
 - (b) Spectrophotometer.
 - (1) Plot absorption curve for a given sample.
 - (2) Check different concentrations of the same substance for conformity to Beer's law.
 - (3) Analysis of an unknown sample by use of spectrophotometer.
6. Physical properties of liquids and solids.

Note: Each student selects one laboratory project from this group.

 - (a) Surface tension.
 - (1) Effect of surface active agents on surface tension.
 - (b) Viscosity.
 - (1) Measurement of absolute and relative viscosity.
 - (2) Effect of surface active agents on viscosity.
 - (c) Density of specific gravity of liquids and solids.
 - (d) Particle size of suspended solids.
 - (1) Measurement of particle size.
 - (2) Relation of particle size to the use of material in ointments, emulsions, suspensions, powders, etc.

The first unit studied in the course is the measurement of pH, and the use of pH measurements in electrometric titrations. The concept of pH and its relation to the acidity of a solution are generally more or less familiar to students of chemistry before they are ready to take the course in instrumental methods of analysis. The fundamental concepts involved may be profitably reviewed in order to establish a sound and logical foundation for the work included in this unit of the course. In the detailed study of pH measurement the various electrode systems in common use are carefully considered. The advantages, disadvantages, and limitations of each electrode system are studied. It may be found that one electrode system is preferable for a certain type of pH measurement, while for another type of solution a different electrode system may be desired. In the laboratory the student first learns to measure the pH of buffered solutions and dilute solutions of weak acids. He then proceeds to the titration of a weak acid, determining the end point of the titration potentiometrically. From the initial pH of the acid solution and the titration data the student is able to calculate the degree of ionization of the acid, and also the ionization constant

for that acid. Quantitative determinations involving oxidation-reduction reactions, or the formation of a precipitate, may be carried out by means of potentiometric titration methods, provided a suitable electrode system is selected for the particular problem involved. It is also pointed out to the student that the potentiometric method of determining the end point of a given titration is particularly useful where no suitable color indicator is available, or where there are colored components in the solution which would interfere with the accurate observation of the color change of an indicator.

OPTICAL INSTRUMENTS

The study of a number of optical instruments may be included in a course of this type. Among those to be considered are the polarimeter, refractometer, colorimeter, nephelometer, and spectrophotometer. The optical principles involved in the use of some of these instruments are relatively simple, and may be covered rather rapidly, such as those involved in the polarimeter, for example. Thus the students may be prepared to proceed in the laboratory while the more complex optical instruments, such as the spectrophotometer, are being studied.

The spectrophotometer is not only the most complex of the instruments in this group; but it is the most versatile since it may be adapted to absorption measurements for the entire spectrum, including ultraviolet. If absorption data are desired in the visible range of the spectrum the simple colorimeter or the photoelectric colorimeter may be more easily and rapidly operated than the complex spectrophotometer. In the case of a sample in which the range of maximum absorption, or characteristic absorption, is not known it is possible with the use of the spectrophotometer to plot the relative amount of absorption for each small wave length interval for the entire spectrum, and then from this data select the most suitable wave length for the determination of the concentration of the absorbing substance in the sample being studied.

After the proper wave length for maximum absorption has been found, it is usually necessary to check to determine whether the amount of absorption is proportional to the concentration of the absorbing component in the sample. If it is not, then a calibration curve for the sample must be plotted for various concentrations of the absorbing component covering the range in which a sample of unknown concentration may be expected to fall. In testing for conformity to Beer's law, a number of factors must be taken into consideration, which if not carefully controlled may produce apparent deviations from Beer's law. If the sample contains more than one light-absorbing component, the absorption curve obtained will be the sum of the absorptions of the separate components present in the sample.

PHYSICAL PROPERTIES OF LIQUIDS AND SOLIDS

The nephelometer may be used to determine the concentration of suspended particles in a solution by measuring the intensity of the diffused light reflected by the suspended particles. For this type of measurement the particles must be small enough to remain suspended fairly uniformly in the solution for a sufficient time to allow for the taking of readings of the intensity of the diffused light reflected by the suspended particles. The rate at which the particles tend to settle from the suspension depends on several factors besides the size of the suspended particle. Some of these which should be considered are the density and viscosity of the liquid, the presence of protective colloids, etc. Several of these factors may be controlled by the experimental procedure so that in many

cases satisfactory nephelometer readings may be obtained for the quantitative determination of precipitated substances.

Particle size may be measured by the rate of fall of suspended particles in a liquid of known density and viscosity. In the study of particle size, the effect of surface active agents upon the density and viscosity of the suspending liquid must be considered. The absolute viscosity and the relative viscosity of the liquid, with and without the surface active agent, should be determined.

SUMMARY AND CONCLUSION

The tabulation of laboratory data must be followed by a careful interpretation and evaluation of that data by the student if any real value is to be obtained from the laboratory procedure. This may be the real test of the student's ability.

Care should be taken not to become too deeply involved in theoretical considerations, or to expect the student to become a mere laboratory technician, but to present sufficient fundamental principles to enable the student to understand the laboratory instrument which he is using. The course should give the student a working familiarity with some of the instruments in use today in the research laboratory and in production control methods. The student should acquire a critical appreciation of the advantages and limitations of various instrumental techniques. The time devoted to the discussion of the fundamental principles of the science of instrumentation should make a real contribution to the professional character of the student.

REFERENCES

- (1) Boltz, David F., "Modern Instrumental Analysis," Prentice-Hall, Inc., New York, 1952.
- (2) Willard, Hobart H., Lynne L. Merritt, Jr., and John A. Dean "Instrumental Methods of Analysis," Second Edition, D. Van Nostrand Co., Inc., New York, New York, 1951.
- (3) Ewing, Galen W., *J. Chem. Ed.*, 27, 297 (1950).
- (4) Basset, L. G., J. H. Harley, and S. E. Wiberley, *Ibid.* 28, 466 (1951).
- (5) Strobel, Howard A., *Ibid.*, 31, 159 (1954).

Pharmacy is one of the most varied, useful and responsible divisions of the health professions.

R. A. Kuever, *Am. J. Pharm. Ed.*, 5, 439 (1941)

GRADUATE STUDY IN MEMBER COLLEGES FOR 1957-1958 AND GRADUATE ENROLLMENT, SEPTEMBER, 1956

In late November a detailed report on graduate study was mailed to the deans and department heads of all member colleges, for their information and for the information of prospective graduate students. One of the tables from the report is included here, as well as a summary of additional data.

Abbreviations of the table are self-explanatory except for the asterisk. This signifies programs in pharmacology or in business administration available to students with a B.S. in Pharmacy in departments of a parent university other than its college of pharmacy. For additional explanatory notes see the Winter, 1956, issue of the Journal, p. 82.

Fifty institutions are listed as having graduate programs available for 1957-1958. One of these is outside the continental limits of the United States, and three others do not sponsor the programs within the college of pharmacy. Forty-six member colleges within the country, therefore, sponsor graduate programs within the college in one or more areas of professional instruction.

Forty-two of these forty-six colleges reported one or more graduate students enrolled in September, 1956. Three hundred forty-four students were candidates for master's degrees, 290 for doctor's degrees, and twenty-nine were special students. An additional seventeen pharmacists were master's candidates, twenty-six were doctor's candidates, and one was a special student in other units of parent institutions, giving a total of pharmacists engaged in professional graduate study, in member institutions, of 361 master's candidates, 316 doctor's candidates, and thirty special students (707 grand total).

A few pharmacists are known to be pursuing professional graduate study in pharmacology or in business administration in universities not having colleges of pharmacy, and a few others are enrolled as graduate students in nonprofessional fields. The first students might add a dozen, more or less, to the total group, and the last-named students might add another dozen or so graduate students to give a total of about 735 pharmacists pursuing graduate studies in September, 1956.

Forty-five colleges report that one or more types of local financial aids will be available to new graduate students in 1957-1958. There will be at least fifty-two fellowships and scholarships, 193 assistantships, and forty-eight internships in hospital pharmacy available. These do not include a considerable number of AFPE fellowships which will also be available. Also to be added are general university scholarships for which pharmacists may apply. Twenty-two colleges report that such aids will be provided in 1957-1958.

In addition to the aids to be available to new graduate students, member colleges report additional aids provided for, but preempted in 1957-1958 by current holders who will continue graduate study, to be sixty-three fellowships and scholarships, ninety-seven assistantships, and eighteen internships in hospital pharmacy. It thus appears that total graduate financial aids provided in member institutions in 1957-1958, local and AFPE, will be approximately 190 fellowships and scholarships, 290 assistantships, sixty-six internships in hospital pharmacy, and an unknown but appreciable number of general university grants. The total will probably exceed 600, representing aid to 85 per cent or more of pharmacists pursuing graduate studies.

A substantial majority of the fellowships are for sums between \$1,000 and \$1,800; the assistantships between \$1,200 and \$1,800 (usually slightly higher than the fellowships); and the internships between \$1,500 and \$2,500 (usually considerably higher than the assistantships but requiring more hours of service per week). Remission of tuition or adjustment of out-of-state differential is extremely variable. It appears that lower aids often include such remission, but sometimes the higher aids also carry remission of fees.

The list of administrative officers and college addresses is not given in this summary. In 90 per cent of the colleges the dean is the officer to address; see the Summer, 1956, issue of the *Journal*, p. 438. In all cases the dean can advise where to apply for further details.

Copies of the complete report are available gratis from the Secretary, AACP, 833 So. Wood Street, Chicago 12, Illinois.

Richard A. Deno, Chairman
Committee on Recruitment Aids

TABLE I
Graduate Programs Available, 1957-1958

Member College	Phcy.	Ph. Ch.	Phcog.	Phcol.	Ph. Ad.	Ho. Ph.
Alabama P.I.	M	M	M	M		
U. Arizona	M	M	M	M	M	
U. California		M D		M* D*		
U. So. California	M D	M D	M	M D		M
U. Colorado	M D	M D		M* D*	M D	
U. Connecticut	M D	M D	M D	M D		M
G. Washington U.				M* D*	M* D*	
U. Florida	M D	M D	M D	M D		
U. Georgia	M	M		M	M*	
U. Illinois	M	M D	M D	M* D*		M
Butler U.	M	M		M		
Purdue U.	M D	M D	M D	M D	M	M
Drake U.				M		
S. U. Iowa	M D	M D		M* D*	M*	M
U. Kansas	M	M D	M	M	M	
U. Maryland	M D	M D	M	M D		M
Massachusetts C.P.	M D	M D	M D	M		M
U. Michigan	M D	M D		M* D*	M* D*	M
Wayne S.U.	M	M	M	M		M
U. Minnesota		M D	M D	M* D*	M* D*	
U. Mississippi	M	M				
St. Louis C.P.	M					M
U. Kansas City	M	M	M	M		
Montana S.U.	M	M	M	M		
Creighton U.				M*		
U. Nebraska	M D	M D	M D	M D		M
Rutgers U.	M	M		M		
Brooklyn C.P.					M	
Columbia U.	M	M	M	M		
U. Buffalo	M	M D		M* D*	M*	M
U. No. Carolina	M D	M D	M D	M*		
No. Dakota A.C.	M	M		M	M*	M
Ohio S.U.	M D	M D	M D	M D	M D	M
U. Oklahoma	M	M	M	M		
Oregon S.C.	M D	M D	M D	M D		
Duquesne U.	M	M	M	M		
Philadelphia C.P.	M D	M D	M D	M D		M

TABLE I (Continued)
Graduate Programs Available, 1957-1958

Member College	Phcy.	Ph. Ch.	Phcog.	Phcol.	Ph. Ad.	Ho. Ph.
Temple U.	M	M		M		M
U. Pittsburgh	M D		M	M	M D	
U. Philippines	M D	M D	M D	M*		
M. C. So. Carolina				M* D*		
So. Dakota S.C.		M		M		
U. Tennessee		M		M* D*		M
U. Houston	M	M	M	M		M
U. Texas	M D	M D	M D	M D	M* D*	M
U. Utah	M D	M D	M D	M D	M	
M.C. Virginia		M D		D*		M
S.C. Washington	M D	M D	M D	M D		
U. Washington	M D	M D	M D	M* D*		
U. Wisconsin	M D	M D		M* D*	M D	
Total	40M 21D	43M 26D	29M 16D	31M 12D 16M* 12D*	9M 4D 9M* 4D*	20M

A student of pharmacy today is planning to become a professional man in every sense of the word. If he fails to become a professional man it is a reflection of the fact that the faculty which taught him failed to impress on him sufficiently the ultimate goal of his education.

Morris Fishbein, *Am. J. Pharm. Ed.*, 5, 465 (1941)

REPORT OF THE REPRESENTATIVE TO THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS

The 58th annual convention of the National Association of Retail Druggists opened on Monday, September 17, in the Music Hall, Cincinnati, Ohio, with the extensive drug show that has become an integral part of this annual meeting. One hundred fifty manufacturers of every type of product sold in a modern drugstore displayed their wares and dispensed samples and souvenirs. The convention closed on Friday with a drawing of prizes given by the Association and by the exhibitors at the drug show.

The business part of the week's program was devoted chiefly to addresses on various phases of merchandising and on closely allied topics. A rather extensive recreational program was interwoven among the serious discussions of the convention.

Several addresses by national leaders were presented, including one by United States Senator William F. Knowland, entitled "A Foreign Policy for Americans," and another by Congressman Wright Patman, who discussed a program for independent business in the next congress.

Dr. Albert H. Holland, Jr., Medical Director of the Food and Drug Administration, spoke, as did Commissioner of Narcotics H. J. Anslinger. Dean Ivor Griffith of the Philadelphia College of Pharmacy and Science delivered an address entitled "The Mosaic of Pharmacy," in which he made a strong plea for clean and orderly drugstores, ethical conduct in both professional and commercial aspects of retail pharmacy, and active participation by practicing pharmacists in community projects. An oblique reference to the extended educational program in pharmacy contained reference to "many a potential Nashua or Whirlaway . . . overtrained into mediocrity. . . ."

The Association adopted resolutions supporting legislation providing methods of enforcing professional conduct, and recommending special penalties for narcotic irregularities involving the drugs most commonly used by addicts. A considerable number of resolutions pertaining to business aspects of the practice of pharmacy were also adopted.

A rather detailed summary of the convention, including a digest of resolutions adopted, is contained in the October 8, issue of the *American Druggist*. Dean Griffith's address can be found in the October 15, issue of the *NARD Journal*.

Richard A. Deno, Representative

Pharmacy is an authorized and accredited instrumentality for public service, open to public scrutiny, subject to public regulations, and subordinated to public opinion.

R. A. Kuever, *Am. J. Pharm. Ed.*, 5, 439 (1941)

REMINGTON HONOR MEDAL CITATION FOR FRANK W. MOUDRY *

HUGO H. SCHAEFER

In honoring Frank W. Moudry tonight, we are honoring a retail pharmacist who throughout his years of activity has been a steadfast and fearless champion of his profession.

The previous speakers on this program have ably presented the aims and accomplishments of Frank W. Moudry, and it would be repetitious for me to further discuss at length the reasons for this award. Nevertheless, I cannot refrain from characterizing Frank W. Moudry as primarily a man from the ranks of retail pharmacy whose keen mind and unrelenting but unselfish devotion to his profession have made him a leader in whom we all have the utmost confidence.

I herewith present the thirty-third Remington Honor Medal to Frank W. Moudry of Saint Paul, Minnesota, Past President and former Chairman of the Executive Committee of the National Association of Retail Druggists, Past President of the National Association of Boards of Pharmacy, active member of the American Pharmaceutical Association, Secretary for many years of the Minnesota State Board of Pharmacy. In the latter capacity he furthered pharmaceutical legislation and was instrumental in having facts and issues presented to the courts which resulted in judicial opinion of the utmost significance to retail pharmacy. An outstanding authority on professional and economic problems, he served as spokesman for pharmacy to the medical profession, was a member of the committee on the Pharmaceutical Survey which so thoroughly analyzed the status of pharmacy, and is a member of the American Council on Pharmaceutical Education where he is a vigorous exponent of the views and needs of retail pharmacy.

This medal is presented to you for these and other past accomplishments, but you are still in the prime of life, and I am sure that in the minds of all of us, there is the hope and expectation of still greater things to come. My congratulations, Frank W. Moudry.

* Given at the Remington Medal Dinner, December 3, 1956, New York City.

While just a few decades ago the pharmacist was one of the small number of formally educated men in his community, today he no longer enjoys that distinction. That enviable position can only be restored by appropriate and superior education.

H. Evert Kendig, Am. J. Pharm. Ed., 5, 461 (1941)

REPORT OF THE COMMERCIAL AUDITORS

ICERMAN, JOHNSON & HOFFMAN
CERTIFIED PUBLIC ACCOUNTANTS

October 4, 1956

To the Executive Committee
American Association of Colleges of Pharmacy
Gentlemen:

We have examined the accounts of the Secretary-Treasurer of the American Association of Colleges of Pharmacy for the year ended July 31, 1956. Our examination was made in accordance with generally accepted auditing standards, and included such tests of the accounting records as we considered necessary.

We ascertained that all receipts recorded were deposited in the accounts, but we did not make an outside verification as to the amounts remitted to the Secretary-Treasurer. We reviewed the record of disbursements and examined the supporting data which were found to be satisfactory. The bonds were inspected.

In our opinion, the accompanying financial statements present the results of operations of the American Association of Colleges of Pharmacy for the year ended July 31, 1956, and the fund balances at that date.

Very truly yours
Icerman, Johnson & Hoffman

AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY SUMMARY OF FUNDS YEAR ENDED JULY 31, 1956

General Fund

Balance, August 1, 1955:		
Cash in bank	\$14,887.03	
United States Savings Bonds	6,000.00	\$ 20,887.03
Receipts (Schedule attached)		32,697.27
Transfer—Fund for Study of Pharmacy		4,149.06
Total		\$ 57,733.36
Disbursements (Schedule attached)		36,142.87
Balance, July 31, 1956		\$ 21,590.49

Fund for the Study of Pharmacy

Balance, August 1, 1955:		
Cash in bank	\$ 642.64	
United States Savings Bonds	3,500.00	\$ 4,142.64
Receipts:		
Interest on savings		6.42
Total		\$ 4,149.06
Disbursements:		
Transfer to general fund		4,149.06
Balance, July 31, 1956		\$.00

Recruitment Aids Program Fund

Balance, August 31, 1955		\$ 13,555.63
Receipts:		
American Foundation for Pharmaceutical Education (Note A)		55,000.00
Revenue from films		1,134.00
Total		\$69,689.63
Disbursements		60,068.97
Balance, July 31, 1956		\$ 9,620.66
Total—all funds		\$ 31,211.15

Summary of Fund Balances

July 31, 1956

General Fund:

Ann Arbor Bank—commercial account	\$11,590.49	
United States Savings Bonds—Series K	10,000.00	\$ 21,590.49

Recruitment Aids Program Fund:

Ann Arbor Bank—commercial account	9,620.66	
Total—all funds		\$ 31,211.15

Note A—These receipts include an advance of \$20,000 from the 1956-57 grant of the American Foundation for Pharmaceutical Education.

American Association of Colleges of Pharmacy General Fund

Statement of Receipts and Disbursements, Year Ended July 31, 1956

Receipts:

Dues	\$ 15,200.00
Journal subscriptions	2,393.44
Grants—American Foundation for Pharmaceutical Education:	
Seminar	7,000.00
Journal	5,000.00
Brochure— <i>Shall I Study Pharmacy</i>	2,642.50
Interest	255.70
Miscellaneous	205.63
Total	\$ 32,697.27

Disbursements:

Annual meeting	\$ 1,942.92
Interim meeting—executive committee	1,115.45
Representatives and delegates expenses	1,571.03
Dues and contributions	1,691.50
Salaries and honoraria	6,226.22
Journal	9,777.43
Brochure	118.40
Committees	2,871.81
Seminar:	
1955	4,369.27
1956	4,909.72
Stationery, mimeographing and office supplies	838.07
Postage, telephone and telegrams	589.82
Miscellaneous	121.23
Contingency	.00
Total	\$ 36,142.87

Until you get rid of the idea that any man has a proprietary interest in the profession, that a certain part of pharmacy may be staked out as private property, pharmacy as a profession will not advance.

Morris Fishbein, *Am. J. Pharm. Ed.*, 5, 469 (1941)

MINUTES OF THE INTERIM MEETING EXECUTIVE COMMITTEE

Hotel LaSalle, Chicago, Illinois

November 15-16, 1956

The meeting was called to order by Chairman Zopf at 8:50 a.m.

Present: President, Harold G. Hewitt; Vice President, Tom D. Rowe; Past President, Linwood F. Tice; Chairman, Louis C. Zopf; Charles W. Bliven; Loyd E. Harris; Jack E. Orr; Joseph B. Sprowls; Secretary, George L. Webster; Editor, Melvin R. Gibson; Consulting Editor, Rufus A. Lyman.

1. Approval of Minutes.

Moved by Rowe-Bliven that the minutes of the post-convention meeting be approved as printed.

2. Additions to Original Agenda.

Five additional items for discussion were added to the agenda.

3. Communications.

a. *From Nicholas Gesoalde*, Secretary, New York State Pharmaceutical Association, containing the preamble and resolution which has been suitably acknowledged by the Secretary. (Addendum A original minutes)

b. *From Mrs. Phyllis Christensen Ogan*, a gracious acknowledgement of a telegram and flowers sent up on the occasion of the death of her father, AACP Past President and Past Chairman of the Executive Committee, Bernard V. Christensen. (Addendum B original minutes) *On motion* of Tice-Rowe, it was declared to be a policy for the guidance of officers that floral tributes should be sent on the occasion of the death of past presidents or current officers only. This action does not in any way minimize the value of the services contributed by many dedicated persons in committee work, but is prompted only by what is considered to be a conservative fiscal policy.

c. *From Robert L. Swain*, Treasurer, and F. Royce Franzoni, Chairman of the Joint Committee (AACP; A.Ph.A.; NARD) on the Status of Pharmacists in the Government Service, presenting the financial condition of this committee and the problems which it intends to consider. A meeting of this committee has been called for November 18-19, 1956, in Washington, D.C. The Chairman of the Executive Committee authorized the attendance of the three representatives of the Association, Robert L. VanHorne, Loyd E. Harris, Pierre Smith, and asked approval of the Executive Committee for this expenditure of funds. *On motion* of Webster-Tice, approval was given.

d. *From A.Ph.A. Secretary, R. P. Fischelis* regarding time and place of 1957 Annual Meeting: The first general session to begin on Sunday afternoon, April 28, with final session to conclude on Tuesday afternoon, April 30. Headquarters hotel, The New York Statler.

4. Report of Commercial Auditors.

The report of the commercial auditors on the audit of the accounts of the Secretary-Treasurer was read. *On motion* of Harris-Sprows, the report was approved. (Addendum B original minutes) A copy of the audit was referred to the Editor of the Journal for publication.

5. Report of Committee on Recruitment Aids.

The Secretary read the progress report of the Committee on Recruitment Aids. *On motion* Rowe-Orr the Executive Committee approved the suggested request that the American Foundation for Pharmaceutical Education be asked

to grant a sum of \$10,000 to implement the distribution of the films for the year beginning March 14, 1957.

The Secretary reported that as a result of the distribution of 25,000 copies of *Shall I Study Pharmacy* by the National Science Teachers' Association, requests for over 2,000 copies from high school advisors have been received. It was not known whether the requests were just beginning or whether those at hand represented the bulk of the requests for this year. It was the opinion of the Executive Committee that these requests should be honored. *On motion* of Hewitt-Sprowls, the Secretary was authorized to determine, if possible, the extent of the demand and, if necessary, present a request to the American Foundation for Pharmaceutical Education for funds with which to purchase the necessary copies of the brochure.

6. and 18. Report of the Committee on Constitution and Bylaws.

A preliminary report of the Committee on Constitution and Bylaws was given by its chairman, Dean Jack E. Orr, and the recommendations of the committee were discussed. The discussion also ranged over the subject of the wording of the revision of Article I, Section 7 (b) which was referred back to the Committee on Constitution and Bylaws by the membership at the 1956 annual meeting. This is Item 18 of the agenda. Since the discussion was advisory, the committee's report will be submitted to the membership in due form as required by the Bylaws.

7. Reports of Official Representatives at District Meetings of NABP and AACP.

For further information on these matters write the Chairman or Secretary for that meeting.

Program items which were considered by the representative to be noteworthy were mentioned and discussed.

District 2, Dean Bliven: The program included: a presentation of aims and organization of the Health News Institute by Mr. Chet Shaw; a report on enrollment on the six colleges of the District was presented showing an over-all decrease of eighty-one students with the decline shared by all colleges except those in the District of Columbia (plus sixteen) and Virginia (plus seven); a total of 5,004 students were enrolled in this district. A resolution was passed urging that the five year educational program be commenced not later than the fall of 1960 and that no other program be offered to students after that date.

District 3, Dean Rowe: A noteworthy subject of discussion at this meeting was the report on the scholastic survival of students as reported in a survey taken at the University of South Carolina.

District 5, Dean Zopf reported a lively discussion of the matter of the degree or degrees to be given for completion of the five year educational program.

District 7, Dean Orr reported that notable topics were concerned with what is being taught in the professional courses in pharmacy at present and the justifications for this subject matter. What the employer expects of his pharmacist employee was also discussed.

District 8, Dean Zopf reported an interesting discussion on the topic, "Are Pharmacy Teachers the Weakest Link in Pharmaceutical Education?" The matter of the latest starting date for an entering class on the four year educational program came into the discussion in this district.

8. Consideration of Invitations for the Teachers' Seminar in Pharmacology for 1957.

Invitations with a description of the facilities for the program and for housing were received from five member colleges. Each was fully considered and discussed by the Executive Committee. It was decided to accept the invitation extended by the University of Washington, College of Pharmacy, Seattle, Washington, for the week beginning Sunday, July 14, 1957. An announcement carrying details of the housing costs and program will be made by the host college and the committee as soon as possible.

9. Consideration of Resolutions Referred to the Executive Committee at the Annual Meeting, 1956.

a. *Resolution 2: Am. J. Pharm. Ed. 20, 367 (1956).* After extended discussion the Executive Committee adopted without dissent the following statement as a guide for deans and admissions officers of member colleges: Whereas, it is known that the admissions policies of all institutions of higher learning are not uniform, but whereas, it should be the intention of all member colleges to conduct their admissions in accordance with generally accepted principles of academic integrity, the Executive Committee believes that the following statement of principle should guide all member colleges in their admission practices:

Colleges of Pharmacy who are asked to admit students who have previously attended another college of pharmacy should require, as a condition of admission a letter from the college last attended stating whether the student is eligible for continuing registration in or re-admission to that college.

b. *Resolution 4: Am. J. Pharm. Ed. 20, 368 (1956).* *Moved*, Rowe-Bliven that, while the Executive Committee is in sympathy with and recognizes the values accruing from the recommendation, if implemented, it regretfully takes note that sufficient funds are not now available to finance a film depository as outlined in the proposal. *Passed.*

The Secretary volunteered to explore the possibility and costs of establishing a film depository of the nature recommended as a service in one of the existing film libraries now operating in the field of the medical sciences in Chicago. A report on the results of this exploration to be made to the Committee on Audio-visual Education.

c. *Resolution 5: Am. J. Pharm. Ed. 20, 368 (1956).* It was the consensus of the Executive Committee that, as a first step in the implementation of this resolution, the Committee on Predictive Tests (Chairman, J. B. Sprowls) prepare an outline of its proposal suitable for presentation to the board of grants of an educational foundation. When this has been accomplished, the Executive Committee will, through all suitable means, aid the Committee in securing the necessary funds.

d. *Resolution 15: Am. J. Pharm. Ed. 20, 369 (1956).* The Executive Committee is of the opinion that this has potential value for our educational efforts, but that the resolution and its supporting arguments are insufficiently specific in the matters of procedures and costs. *It was voted* Rowe-Webster to ask the sponsoring committee to continue its study of this matter and to furnish to the Executive Committee a more detailed proposal for action.

e. *Resolution 17: Am. J. Pharm. Ed. 20, 369 (1956).* The Secretary was directed to determine from the sponsoring committee, what funds the proposed study might require above those now allowed for the work of this committee.

f. *Resolution 20: Am. J. Pharm. Ed.* 20, 370 (1956). The Chairman was directed to appoint qualified persons to a "Graduate Study Advisory Committee" when, as, and if such a committee was requested by a member college.

10. Bond for Chairman.

The Secretary reported that the fidelity bond on Chairman Zopf had been renewed.

11. Conference with ACPE.

Specific items to be discussed when the officers meet for a joint conference with the American Council on Pharmaceutical Education, January, 1957, were: Items 9(a), 12, 17, and 18 of this agenda.

12. Report of the Sub-Committee on Awards and Aids.

Dean Rowe presented a report which reviewed the circumstances which led to the appointment of the Sub-Committee and set forth the thinking of the Sub-Committee on the subject of prizes offered to students of pharmacy on a national scale in contradistinction to aid to pharmaceutical education. Certain editorial amendments to the original wording were offered and accepted and, *on motion* Rowe-Orr, the statement of the Sub-Committee was accepted. The Secretary was directed to send copies of the statement to the secretaries of the American Drug Manufacturers' Association, Proprietary Association, The National Association of Chain Drug Stores, National Wholesale Druggists' Association, other organizations related to the drug industry, and to the pharmaceutical press. The statement comprises Addendum C of the original minutes.

13. Remington Medal Dinner Representative.

Chairman Zopf was directed to write to the chairman of arrangements for the Remington Medal Presentation Dinner that this Association would be represented officially at that dinner by President Hewitt, and stating that this Association would appreciate it if a suitable acknowledgement of this representation could be arranged.

14. A.Ph.A. Resolution.

Attention was called by the delegate to the House of Delegates of the A.Ph.A., Dean Rowe, to a resolution adopted by the A.Ph.A. directing the appointment of a special committee to study the educational program in pharmacy. President Hewitt was directed by the Committee to communicate with President MacCartney of the A.Ph.A. urging that, in appointing this Committee, at least one of the members be a person recommended to him by the Executive Committee of the AACP.

15. Change in AACP Membership Status.

What criteria shall this Association develop to evaluate requests for change of status from Associate Member to Member of the AACP? This item was deferred to the next meeting of the Executive Committee.

16. The American Journal of Pharmaceutical Education.

a. Editor Gibson reported on the Fall issue of Volume 20 (1956). This issue contains many of the papers presented at the 1956 Conference of Teachers, and a cumulative index for volumes 14 to 20 inclusive covering some sixty pages. The larger size made it necessary to change the binding from a stapled type to a sewed type. The improved manageability of this type of binding caused the Publication Committee to recommend and the Executive Committee to approve the use of it on future issues of the Journal. The Committee also approved the recommendation that the Journal page size be increased. The new

format will be used for the first time with Volume 21, No. 1, the Winter issue, 1957. Approval was given to incur the increased cost. The Winter and Spring issues are planned as feature issues following the pattern of the 1956 Winter and Spring issues. A table of contents for Volume 20 will be mailed with the Winter issue. This new policy was adopted to follow the procedure of other journals in supplying such a table for volumes to be bound.

b. The Secretary reported that the bargain rate of subscription (three years for \$10.00) had not achieved its purpose of stimulating new subscriptions and was sparingly used by old subscribers. It was pointed out that the full subscription rate now in effect, of \$4.00 per year, did not cover the mechanical costs of production. Since renewal notices have already been sent out for Volume 21, no immediate adjustment of the subscription price can be made. Consulting Editor Lyman recommended that the situation with regard to mechanical and other costs be presented to the American Foundation for Pharmaceutical Education along with a request for additional financial support for the Journal.

On motion of Hewitt-Sprohls, the subscription rate of \$10.00 for three years shall no longer be in effect after December 31, 1956.

On motion of Rowe-Sprohls, the subscription rate for *The American Journal of Pharmaceutical Education*, beginning with Volume 22 for 1958 and thereafter, shall be five dollars per volume of four issues and one dollar and twenty-five cents for a single issue.

17. Implementation of the Five Year Program of Education for Pharmacy.

Should colleges admit students to both the four year and five year programs in the fall of 1960? Extended discussion of this problem produced agreement among the members of the Executive Committee that the intent of the Association in adopting the amendment to Article I, Section 7(a) of the Bylaws establishing the five year program was that colleges who had accepted students into a curriculum requiring a total of five collegiate years for completion should provide a professional and educational curriculum which was broader in scope and more mature in its presentation than that offered to students in the four year program. The Committee is aware that a caution has been presented repeatedly by and in discussions of the reports of Committees on Curriculum that to do otherwise would be to fail to achieve the educational values of the five year program. It agreed that some statement of policy which all member colleges as well as the American Council on Pharmaceutical Education could accept as a guide was desirable. This item was directed to be presented to the anticipated joint meeting of the officers of the AACP and the Council in January, 1957.

18. Five Year Degree.

What degree may or should be awarded for completion of the five year program? See Item 6 of these minutes.

19. Plan for Teaching and Research Improvement.

President Hewitt presented a proposal entitled, "A Proposed Plan for Improving Research and Teaching Conditions in Colleges and Schools of Pharmacy in the United States." The proposal was referred to the Committee on Graduate Study for its consideration and recommendation.

20. Public Law 835.

President Hewitt and Dean Bliven reported on the eligibility of colleges of pharmacy to receive grants under Public Law 835, The Health Research Facilities Act of 1956. This is an act "to assist in the construction of facilities

for the conduct of research in the sciences related to health by providing grants-in-aid on a matching basis to public and non-profit institutions for such purpose." President Hewitt and Dean Bliven were of the opinion that colleges of pharmacy are eligible for assistance under the act, although pharmacy is not specifically mentioned, if the projected building is to be used entirely for research activities. Application for assistance should be mailed to Health Research Facilities Branch, Division of Research Grants, U.S. Public Health Service, Bethesda 14, Maryland.

President Hewitt was asked to write to Dr. Kenneth M. Endicott, Scientific Director, Division of Research Grants, National Institutes of Health, Public Health Service, and to Secretary Fischelis of the A.Ph.A., urging them to make every effort to have pharmacy included by name in all future bills intended to provide funds for or assistance in the promotion of public health.

21. District A.Ph.A. Meetings with AACP-NABP.

The advisability of holding a district meeting of the A.Ph.A. in conjunction with the district meeting of the AACP and NABP was discussed. *Moved* by Rowe-Orr, that the Executive Committee is of the opinion that the intimate and informal atmosphere of the district meetings of the AACP and NABP would be impaired by the enlargement of the meeting and the inclusion of a necessarily formal program of a district meeting of the A.Ph.A. It is *moved, further*, that a copy of this motion be transmitted to Secretary Fischelis of the A.Ph.A. *Passed.*

22. Committee on Pharmacy College Libraries.

The receipt of a report of the activities of the Joint Committee on Pharmacy College Libraries was reported by President Hewitt.

23. Mimeographing of Annual Meeting Reports.

Should reports of committees and representatives continue to be mimeographed in advance and distributed at the time of presentation at the Annual Meeting? The consensus was that this practice should be continued, but that committee chairmen should be urged, if possible, to have the mimeographing done at their own institutions and, out of the committee budget or, if no budget has been provided, out of college funds, since the Association budget allows little money for such expenditures.

24. A.Ph.A. Delegate Report.

Dean Bliven as alternate delegate to the A.Ph.A. House of Delegates reported the highlights of the mid-year meeting.

25. Alternate Delegate to A.Ph.A.

Dean Rowe, delegate to the A.Ph.A. House of Delegates, recommended that it become the accepted procedure for the Association to name an alternate delegate to attend the mid-year meeting. Dean Bliven recommended that, if possible, the delegate attend both the annual and mid-year meetings. Since Dean Rowe is the elected delegate until 1959 and will preside in the AACP next year, the resolution of this problem for 1957 was referred to him.

26. Health News Institute.

Chairman Zopf was directed to communicate with Mr. Chet Shaw of the Health News Institute to inform him that the Association has a Committee on Public Relations, Dean C. W. Bliven, Chairman, which may be consulted on matters relating to the AACP and the Health News Institute.

27. Representation on the Policy Committee of the Division of Hospital Pharmacy of the A.Ph.A. and ASHP.

The attention of the Executive Committee has been directed to a resolution passed by the American Society of Hospital Pharmacists in 1955 and renewed in 1956, that the AACP be officially recognized by the Division of Hospital Pharmacy of the A.Ph.A. and ASHP in the Division activities. After discussion, the Secretary was directed to write to Secretary Fischelis of the A.Ph.A. inquiring as to the present status of this recommendation in the plans of the Division of Hospital Pharmacy.

28. Shall I Study Pharmacy Distribution.

Fiscal policy in regard to distribution of *Shall I Study Pharmacy* in response to requests was discussed. See Item 5 of these minutes.

29. Pan-American Congress of Biochemistry and Pharmacy.

A report on plans for the Pan-American Congress of Biochemistry and Pharmacy, week of November 3, 1957, Washington, D.C., was presented by President Hewitt. The theme of the Congress is to be "Cooperation Among American Nations in Pharmaceutical Affairs." President Hewitt has been named Chairman of the Program Committee. He reported that the program will extend for five days. It will include opening and closing general sessions and two plenary sessions of the Congress. The scientific program will be distributed among twelve subsections each with a chairman, who is to be a scientist from Latin America, and a secretary from North America. Each subsection will have three meetings of a half-day duration with the time arranged to avoid conflicts between sections having probable joint concern. On-the-spot translation service similar to that provided in the United Nations General Assembly will bridge the language barriers where they exist.

30. New York Meeting of Executive Committee.

Time of the pre-convention meeting of the Executive Committee was set for Friday, April 26, 9:00 a.m., the place of meeting to be the New York Statler. Items for the agenda will be received by the Chairman at any time.

Meeting adjourned at 12:10 p.m., November 16, 1956.

George L. Webster, Secretary

It is in his attitude toward life and the way he lives that a professional man differs from a tradesman or a laborer. That professional attitude makes him a professional man.

Morris Fishbein, Am. J. Pharm. Ed., 5, 467 (1941)

PRESIDENT'S SECTION

FOURTH PAN-AMERICAN CONGRESS OF PHARMACY AND BIOCHEMISTRY

It is important that we keep you informed of the progress of the Fourth Pan-American Congress of Pharmacy and Biochemistry and remind you frequently of this important event scheduled for November, 1957. The organization is proceeding smoothly and rapidly under the able guidance of Dr. Robert Hardt, Organizing Committee Chairman, and George Griffenhagen, Executive Secretary. I want to repeat the dates so that you can add them to your new calendar of events for 1957. The time is November 3rd through the 8th, 1957, and the place is Washington, D.C.

The organization is now complete with respect to the section secretaries, and I report their names for your convenience in getting in touch with them to advise them of papers which you may wish considered for these meetings. They are:

Pharmaceutical Chemistry and Biochemistry—George P. Hager
Pharmaceutical Economics and Management—Paul C. Olsen
Historical Pharmacy and Historical Biochemistry—Glenn A. Sonnedecker
Pharmacopoeias and Formularies—Lloyd C. Miller
Pharmacy Laws and Ethics—P. H. Costello
Pharmaceutical Journal Editors—Dan Rennick
Pharmacology—James C. Munch
Pharmacognosy, Phytochemistry and Botany—Heber W. Youngken, Jr.
Pharmaceutical Education—Melvin W. Green
Hospital Pharmacy—Grover C. Bowles
Practical Pharmacy—Robert E. Abrams
Manufacturing Pharmacy—Adolph Tiesler

In general terms there will be an opening or preparatory session, a closing session, and three, possibly four, plenary sessions. It is expected that the plenary sessions will be dedicated to laws and regulations, and to clinical and pharmaceutical research and education. The individual sections will probably have only two sessions for their meetings. Each of the papers presented will be limited to fifteen minutes including the discussion. Elaborate plans are under way for the entertainment of delegates and guests, including musical events, receptions, buffet suppers, dinners, tours in and around Washington, and a banquet. There will be a special program for the wives of the delegates. All in all, it is hoped that, with the plans under way and those yet to come, this event will leave memories long to be cherished.

The vast amount of work carried on by Chairman Hardt and Executive Secretary Griffenhagen cannot be realized unless you are privileged to be associated with them as I have been. Pharmacy throughout the Americas cannot help but benefit by this Congress if each of you contributes only a small part to this extremely important program.

When the secretary of your section of interest makes contact with your school or you directly, I hope that you will be ready to carry your share of the respon-

sibility. I know that all who attend this Congress will come away feeling well repaid for their efforts.

If you have any suggestions for speakers from among our American neighbors to the south and our Canadian neighbors to our north, please send me the names and specialties which might be useful in developing our program. I should also be pleased to have the names of any of our members who speak Spanish or Portuguese: your services are needed to serve as good hosts to our visitors. Drop me a line and advise me of your linguistic ability or of that of your pharmaceutical friends.

Again, remember the dates—November 3rd through the 8th, 1957, Washington, D.C.

NABP AND AACP DISTRICT MEETINGS

It has been my privilege to attend District 2 meetings for about twenty years, those of District 1 for nine years, and within the last year to visit Districts 4, 7, and 8. At each of these meetings one always marvels at the fine spirit of cooperation and camaraderie that exists between members of the boards and representatives from the colleges. The friendly arguments that result from honest differences of opinion, the give and take that is the ultimate result of such debates, argues well for the future of pharmacy. Certainly nowhere have I experienced anything but the finest cordiality between members of both groups. This is as it should be, and I hope that it will always be so.

This is the place where we should discuss matters when we do not see eye to eye on some problem, and where we should come to decisions arrived at in the spirit of compromise. The board members here learn that the "ivory towered" inhabitants are real fellows and do have an appreciation of the practical matters involved in pharmacy. The college members learn that the board members are interested in and have constructive ideas about educational matters. This is the forum where constructive moves originate.

I review these facts briefly, for I note moves to complicate matters by trying to sandwich in meetings of the A.Ph.A. Particularly I refer to student branch meetings.

I do not believe this is the place to have these undergraduates in attendance. Discussions will be frank, and if statements are quoted later on out of context they may cause more harm than the small amount of good gained by adding this third group to the meetings. I frankly see little to be gained, but much to be lost. As far as the A.Ph.A. district meetings are concerned, I believe that they should meet at some other time and not take important time away from the board-college problems. Their problems are many times quite foreign to the local needs. Each should have time to reflect upon their own needs under conditions most conducive to the best results in the shortest period of time. I feel certain that the matter of programming would suffer under such a fusion.

This is only one man's opinion, but I do hope that districts will think seriously about complicating matters at their meetings by the enlargement of the number of groups represented. We cannot afford to lose the good will which has developed during the past years, which allows for the excellent results that come from our district meetings.

THE 1956 WISCONSIN PHARMACIST'S INSTITUTE

On November 8, 9, and 10 the University of Wisconsin Extension Services in Pharmacy, in cooperation with the Wisconsin Pharmaceutical Association, sponsored a Pharmacist's Institute. It was my pleasure to be their guest for two of the three days. The first day was devoted to mental health. An excellent program included discussion of community health problems, the nature of mental illness, the role of the pharmacist in community mental health problems, the physiology of the central nervous system as related to mental health, and the pharmacology and therapeutics of tranquilizing agents. The second day was devoted to problems close to the practicing pharmacist. They included the following topics: making your pharmacy professionally successful, dental prescriptions, microfilming of prescriptions, and a panel discussion on building prescription volume in the morning session. During the afternoon we heard about pharmaceutical techniques, new and old, including powder mixing, emulsion technology, ointment technology, and a discussion on prescription problems. Saturday morning involved a summary of the proceedings and the presentation of institute certificates.

I mention these facts in some detail here for I found a program presented which could well serve as a model for many of our endeavors in this matter. The cooperation of the University Extension Division and the School of Pharmacy presented a partnership which could well serve as a model for the rest of us. Here were some 150 participants involved in a program for a period of two-plus days. I commend the arrangements and the results of such efforts to any school wishing to develop its programs along these lines. I have purposely omitted names from this little review, for I am afraid that I might slight one of the large number worthy of commendation who were associated with this successful institute.

FIGURATIVELY SPEAKING

At the recent Wisconsin Pharmacist's Institute, Provost J. Martin Klotsche of the University of Wisconsin-Milwaukee was the speaker at the banquet. He gave a most interesting talk, and among other facts he presented some speculation with figures that I feel is worth repeating. He has consented to allow me to use these facts, and I pass them on for your amusement and amazement. These few lines were taken out of his presentation, "Who Should Be Educated?"

Let me give an example or two, if we can get our sense of perspective, about the importance of universal education. Some time ago a study was released on the cost of World War II to the United States. This study indicated that the war had already cost the United States 400 billion dollars. We are not likely to be impressed by figures any more (I think it was Bertrand Russell who said at one time that the American people would never become civilized until they learned how to be emotionally moved by statistics), so let's take this figure of 400 billion dollars as representing the cost of World War II, and I say "already" because we know that the continuing costs of war are greater than the cost of winning the war itself. What could have been done with 400 billion dollars? Well, we could have made a substantial down payment on a home for every family in the United States, Canada, Australia, New Zealand, Great Britain, Italy, Belgium, France, Germany, and the Soviet Union. There would have been enough money left to build a ten million dollar university in every city with a population of over 200,000 in every one of these ten countries, a ten million dollar hospital in every one of these cities, and still pay the salaries of 150,000 school teachers and 150,000 nurses for a period of five years. I think we need to get a sense of perspective about things that are important.

Provost Klotzsche continued with another example:

We are devoting a great deal of time, and quite properly I think, to security costs. I don't want to be misunderstood here, because I feel that, in the kind of world in which we are living, we need to be well prepared to meet all emergencies. But keeping in mind our security cost for the fiscal year which closed July 1 last, let me give you this example. Every teacher in the United States today could be given a raise of \$1000; every city in the United States with a population of over 2500 could build two elementary schools and one high school; we could hire 250,000 new teachers and pay each one of them a beginning salary of \$4,000, and this still would represent only one-sixth of the total security cost of the United States government during the fiscal year 1956, which began on July 1, 1955, and ended last July.

We can still dream, can't we? Imagine what tremendous results would come if such funds could be turned to educational use.

A PHARMACIST PRESIDENT

It is news when a staff member becomes a dean of a school or college of pharmacy. It is a great occasion when one of our members is honored by selection as a president of a collegiate institution. There may have been others receiving such honors, but in my memory, at least, this is the first time such an honor has come to a dean of a school of pharmacy. I refer of course to Dr. R. Blackwell Smith, Jr., who was inaugurated as the Fourth President of the Medical College of Virginia. This event took place in Richmond, Virginia, at 11 o'clock Monday, December 17, 1956. I know I speak the wishes of every member of our Association when I say, "Congratulations and Good Luck, Bob." We look forward to as fine an administrative job in this position as was characteristic of Bob in his deanship of the School of Pharmacy at the Medical College of Virginia.

PHARMACOLOGY SEMINAR

The Ninth Annual Teachers' Seminar will be held at the University of Washington, Seattle, Washington. This decision was reached at the recent Interim Executive Committee meeting after carefully reviewing the various invitations placed before it. I am not now certain as to the exact dates, but I believe it is to be held in mid-July. Notice of the exact time will be available in the not too distant future.

The Committee under the able leadership of Dean Jack Orr will develop a program of extreme importance to those having biological and more especially pharmacological interests. The members of our teaching staffs in the western areas have long wanted and deserved the selection of one of their schools as the place for a seminar. This meeting should be well attended—watch for the program and plan to attend.

THE BROCHURE AND THE FILMS

I feel certain that members of the American Foundation for Pharmaceutical Education as well as the Committee on Recruitment Aids must feel pleased over the way the films and brochure have been received. 147,700 copies of the brochure have been printed so far and the major portion of these distributed. One of the groups to receive the brochure "Shall I Study Pharmacy?" was the National Science Teachers' Association. In their 20,000 kits of guidance material was a copy of this brochure and a form for requests for additional copies to be used in their programs. These kits were mailed to them this fall, and the requests

for copies so far received by Secretary George Webster has been tremendous. The end is not yet in sight. Certainly such requests should be honored, for these copies are reaching the right place, the interested students known to the guidance directors. Such distribution cannot help but produce good results in our ever increasing recruitment program.

The films *Time for Tomorrow* and *Design for Life* have been well received, and the demands for showings are increasing as their availability becomes known. Certainly the reports sent to each school from Secretary Webster, of the showings in your areas, are most encouraging. We find in our solicitation of guidance directors an increasing interest in these films in conjunction with their career days. It is our custom at UConn to send a staff member along with the films if they wish. This really serves to give pharmacy a fine introduction by word as well as by film. This has proven well worth the effort involved for many excellent students have become interested in pharmacy who might otherwise have escaped our notice.

Mailing folders advertising the two films may be had by addressing your request to Secretary Webster. He had about 53,000 on hand at last report.

I wonder if all of our members are aware of the availability of these two films in black and white for television use? One does not have to wait for a national pharmacy week for showings. Why not contact your TV station to see whether they won't run either or both of these as part of their educational program?

TRANSFER STUDENTS

At the Detroit meeting of the AACP a resolution from the Committee on Relationships of Boards and Colleges was presented, which in essence stated that member colleges of the AACP require a letter of recommendation from a dean or administrative officer as a prerequisite to transfer from one college of pharmacy to another. This was presented without recommendation by the Resolutions Committee and was referred to the Executive Committee for further study. Among many other items on the agenda at the interim meeting of the Executive Committee held in Chicago November 15 and 16, this matter was discussed and approved.

I wholeheartedly concur in this action, and I see no reason why this should not be welcomed by our member colleges. Certainly a student whose academic record is clear has nothing to fear from such a technique of transfer. An accredited institution cherishing its academic reputation will also welcome such a plan. True, such transfers never bulk large in our operations, but there comes a time when we will appreciate such protection. No accredited school should wish to be known as a place where failures from other institutions can seek haven. Any compromise with educational standards, even as a temporary expedient, cannot help but lower the standards in pharmacy. Once done, it is hard to deny a subsequent appeal for consideration.

While this may be a very poor analogy, the situation reminds me of regulations set up to prohibit "tramp athletes" from migrating from one institution to another. Certainly no school of pharmacy worthy of its rating would wish to carry the reputation of a "transfer club" as a result of accepting any applicant without regard to his previous academic record.

Occasionally we have students apply for admission to our colleges who have not indicated former college training. This may be done accidentally or by de-

sign. This type of student can be and is easily taken care of, for most applications carry the statement that any misrepresentation relative to former training will result in summary dismissal. These students present no problem. The "itinerant scholar" does, however. A letter in the student's file from a former dean will serve to explain the situation to anyone entitled to an examination of college records.

IN PHARMACY IT IS "WE"

In the practice of the arts no doubt success is directly dependent to a high degree upon the individual's skill and ability. In the arts, in other words, it is "I." This is not the situation in the sciences nor is it true of pharmacy. Success here typifies the best results of teamwork. In pharmacy it is "We."

Effective pharmaceutical activities in any state must include all components of our profession: the board of pharmacy, state and local pharmaceutical associations, manufacturers and wholesalers, the school or college, and last, but by no means least, the local pharmacists. Much benefit can accrue from the active association of these groups with the school or college of pharmacy in their area. This is not a one-sided blessing, however, for a distinct benefit comes to the college in working with those organizations. I suppose one may be excused for pointing to his region as one which typifies this development of active teamwork to an exceptionally high degree. There is ample evidence on all sides of this fact, with the outstanding example being the fine building which we now occupy.

An actively cooperative campaign among these groups can develop:

1. a well-conceived and properly executed plan of student recruitment.
2. a stronger curriculum through the interchange of ideas between those practicing pharmacy in the field and the teachers of pharmacy.
3. an effective program of supervised internship.
4. an improved system of examination and licensure.
5. an effective program of continued or extension education.
6. improved interprofessional relations with the other members of the health team.

Certainly in no way do I mean to say that such cooperative efforts should be restricted by state borders. It is likewise important that our American Association of Colleges of Pharmacy cooperate with the many other national organizations such as the American Pharmaceutical Association, the American Foundation for Pharmaceutical Education, the American Council on Pharmaceutical Education, the National Drug Trade Conference, the National Wholesale Druggists' Association, and the National Association of Retail Druggists. There are other organizations which might be added to this list, but I mention these particularly for we have in the past been actively associated with these groups in most instances. There should be a regular interchange of ideas between representatives in all these organizations. It is only through such an interchange that we can better understand one another's problems and be helpful to one another in trying to solve them. Each of us is serving pharmacy in his own way, but all toward the same end—an improved profession.

Harold G. Hewitt

EDITORIAL

A model university in American at this time is necessarily at war with the public, for the public has little or no idea what a university is or what it is for.

Robert Maynard Hutchins

One might include many college administrators in the "public" in that quotation, and the statement would still logically follow. An institution of higher learning must be dedicated to the search and dissemination of truth. To most administrators the dissemination, quantitatively evaluated on an inaccurate balance, is clearly understood: the search is something, in their opinion, which must also be done—as time allows, as it can be wedged in, when time can be afforded from a good night's sleep, during vacations, Sundays, holidays, at the noon hour!

The great bulk of scientific research in this day is being done outside the centers of learning. Nowhere is this more true than in the area of pharmacy. The great advances in pharmaceutical research are largely centered in the pharmaceutical industry or in medical schools, often heavily supported by industry. Where in the scheme of things is pharmaceutical research in colleges of pharmacy? On the fringes, groveling for pennies to support research programs largely geared to producing more educators to carry on the groveling in future generations. Where is the fault?

The fault is in the administrators of schools and colleges of pharmacy—the deans and the directors! They have failed in this generation and in generations past to impress upon institutional presidents that pharmacy has a vital role to play in the health sciences, that it can't play that role unless it gets on stage. They have allowed pharmaceutical educators to be classed with teachers of French in determining their work loads. They have failed miserably where medical colleges have profited enormously in convincing senior college administrators that professional educators cannot be classed with the professor of sociology. There is no greater need in a civilized world than the need to preserve that civilization. It is preserved by a greater understanding of what must be done to keep it healthy—physically and mentally. It learns only through research.

Most staffs of colleges and schools of pharmacy in this country are geared to teaching loads with little concern for research time, technicians, space, and equipment—in that order. The deans have not only failed to lead the way as researchers, they have also failed to *clear* the way. There are too many who fit the definition of a dean as expressed by Walter Argow (*The Journal of Higher Education*, 27, 139, 1956): "one who functions in an area of student welfare and extra-curricular activity regulation." The research programs in colleges of pharmacy are withered from apathy, indifference, and undernourishment in the front office.

Why have they failed so miserably? The principal reason is one of numbers and seniority. How many times have you seen a young man join a staff full of energy, ideas, and ambition only to see him fade in the light of an impossible load of the courses no one else wants? The full professors cluck their tongues and say, "I had to do it too when I was new." So the

young man is loaded to the ears in miscellany. The full professor sits back with a normal load and just teaches, or he may, with luck, have a light load. In the latter instance he does one of several things: (1) he tries to become a dean, (2) he makes motions at research, (3) he takes up time-absorbing committee work and glorified clerical jobs (like editing a journal), or (4) he decides it's time he spent more time with the family, his church, or community projects. Why doesn't he do research? He's too far behind the times; he's lost interest; he's lost motivation!

The potential researchers in our colleges of pharmacy are smothered shortly after birth with teaching loads too stifling to bear. Why can't a dean convince a college president he needs more staff? Because he can't say his staff is doing anything but teaching—effectively. What's the answer? Is it a vicious circle? It is vicious if the dean keeps running around in it. The mediocre dean never steps out of line, this one or any other! The miasma obtains.

That dean who dares to prove himself a leader and puts research where it should be—in the hands of those who can and will do it and puts teaching into the hands of those who will do it best—can point to the results and vigorously lead the way to a greater realization of the true destiny of research by putting the “search” back into the centers of learning—of pharmacy!

Melvin R. Gibson

The college of pharmacy of a state university should be the institution to which as a matter of course the members of the other health professions and the public turn for new medicines of greater effectiveness for the treating of disease.

R. A. Kuever, *Am. J. Pharm. Ed.*, 5, 441 (1941)

ANNOUNCEMENTS

Pharmacology Seminar. The American Association of Colleges of Pharmacy 1957 Teachers' Seminar will be held at the University of Washington College of Pharmacy, Seattle, Washington, during the week of July 14. The special Seminar Committee consists of:

Dean Jack E. Orr, University of Washington College of Pharmacy, chairman

Dr. James M. Dille, University of Washington School of Medicine

Dr. Ewart Swinyard, University of Utah College of Pharmacy

Dr. George L. Webster, University of Illinois College of Pharmacy

Dean Louis C. Zopf, State University of Iowa College of Pharmacy

Dr. Nathan A. Hall, University of Washington College of Pharmacy, and Dr. Theodore C. West, University of Washington School of Medicine, will serve in an advisory capacity to the special committee. The Seminar this year will be devoted to the subject of pharmacology. Detailed information will be available soon regarding the program. Information concerning housing facilities and recreational opportunities will be forwarded to all colleges of pharmacy by Chairman Orr in the very near future.

Charles R. Walgreen Memorial Fellowship. The American Foundation for Pharmaceutical Education announces receipt of a gift from the Walgreen family for the establishment of an annual graduate Fellowship memorializing the late Charles R. Walgreen.

All Memorial Fellowship recipients are selected by the AFPE Board of Grants from among the total applicants for Foundation Fellowships.

Other memorial programs of the Foundation are: Gustavus A. Pfeiffer Memorial Postdoctoral Fellowships; Edwin Leigh Newcomb Memorial Awards; Sydnor Barksdale Penick Memorial Fellowships; E. Mead Johnson Memorial Fellowships.

MLA Scholarships. The Medical Library Association will award eight scholarships of \$150 each for courses in medical librarianship to be given during the summer sessions at the library schools of Columbia University, Emory University, the University of Illinois, and the University of Southern California. One scholarship will go to each of the four schools, and four more will be awarded to worthy candidates in any of the four locations.

Application for scholarships should be made to the school at the time of application for enrollment. Since credentials must be approved in advance, application for admission should be made as far as possible before the date of opening of the session and sufficiently early in the year to permit the school to pass upon credentials and forward applications for scholarships to the Medical Library Association. Transcript of academic records should be submitted to the school even if applicant is not a candidate for a degree. March 1, 1957, is the Association's closing date for scholarship applications, and candidates must already have been accepted by the school. Completion of the course will enable a student with a bachelor's degree and one year's library

school training to qualify for Grade I certification by the Medical Library Association.

Candidates should write for application forms and information on tuition and dates of course to: The Dean, School of Library Service, Columbia University, New York 27; The Director, Division of Librarianship of Emory University, Emory University, Georgia; The Director, University of Illinois Library School, Urbana; The Director, School of Library Science, University of Southern California, Los Angeles 7.

Gustavus A. Pfeiffer Memorial Research Fellowships. Gustavus A. Pfeiffer Memorial Research Fellowships are awarded for postdoctoral study, to qualified scholars, investigating specific problems in the areas of pharmacy. These awards are made by the American Foundation for Pharmaceutical Education in memory of the late Gustavus A. Pfeiffer from the income from a gift to the Foundation by Mr. Pfeiffer.

Awards may be made on a full-time basis; or on a part-time basis; to regularly appointed faculty members, provided that the institution agrees to a proportionate reduction in the Research Fellow's teaching load for the period of the award.

Gustavus A. Pfeiffer Memorial Research Fellowships are designed to encourage pharmacy faculty members to engage in sound, original investigations, either as full-time research projects, or as substantial, though part-time projects, in conjunction with a teaching assignment.

These Memorial Research Fellowships provide a stipend adjusted to the previous income level (or part-time academic salary) of each Fellow, on an individual basis. An allowance for necessary supplies and technical services may also be granted.

Applications for Gustavus A. Pfeiffer Memorial Research Fellowships may be made annually, prior to April 15. For application blanks, address the Secretary, Board of Grants of the American Foundation for Pharmaceutical Education, 1507 M Street, Northwest, Washington 5, D.C.

Applicants must submit full details of their education, training and experience, and an adequate resume of the status of their research work and its objectives. The Board of Grants may request additional information and reserves the right to seek recommendations from experts in the field and from the applicants' scientific or academic associates.

Teaching Fellowships in Business (Pharmacy) Administration. The American Foundation for Pharmaceutical Education offers Teaching Fellowships in Business (Pharmacy) Administration, starting September 1, to applicants selected by the Foundation Board of Grants under the following conditions in schools that do not now have an adequate staff in pharmacy administration.

Applicants

1. Must hold at least a B.S. degree in Pharmacy.
2. Must be accepted to a graduate school (or graduate faculty) to major in business (pharmacy) administration. In lieu of unqualified admission to a graduate school, applicants may submit evidence of tentative admission upon satisfactory completion of required undergraduate courses, which must be detailed in the letter of tentative admission.
3. Must present a general plan of study and teaching, covering the total anticipated period necessary to complete all requirements for the master's degree (or higher). (The Foundation will not consider applicants requiring more than three years to complete all requirements for a graduate degree in business

(pharmacy) administration.) This should be signed by the applicant, the dean of the graduate school (or official of the faculty supervising his study), and the dean of the school of pharmacy.

4. Must submit a completed formal application to the Board of Grants, together with a resume of professional, business, and teaching experience.

Colleges of Pharmacy

5. Must agree to appoint the applicant, if selected by the Board of Grants, to the university or college staff, in an appropriate rank (teaching fellow, part-time instructor, teaching assistant, etc.) for the period not more than twelve months of the Foundation's award.

6. Must notify the Foundation by letter that they will match the requested Foundation grant in an equal amount of not less than \$1,800 or more than \$3,000 (the amount to be determined annually by each college), for each twelve months' study and teaching, and pay such combined sum to the Teaching Fellow in the manner customarily followed by other staff members.

Teaching Fellowship grants in business (pharmacy) administration will be for a maximum period of twelve months. Such grants may be renewed for not more than two additional years, under the above conditions. At the expiration of a Foundation grant (not more than twelve months each) all commitments will have been fulfilled and renewal of such grants will be considered only upon the joint request of the candidate and the college. Neither the Foundation, the college, nor the candidate will be under any obligation as to future commitments or affiliation, following graduation or the termination of an annual agreement. As with our regular full-time fellowships, colleges will be expected to refund any portion of the unpaid stipend upon graduation or discontinuance of the Teaching Fellowship. Teaching Fellowships do not carry an academic allocation for tuition, books, etc.

Regular full-time fellowships in all fields of pharmacy, including business administration, also are available.

Applications may be obtained on request of the dean or the candidate from the Secretary of the Foundation. The completed application and other required documents should be received by the Foundation by April 15.

Instructions to Authors. Manuscripts submitted to the Editor, reports to be published, and articles presented to the sections of the Conference of Teachers should conform to standard specifications. All material submitted for publication should be prepared in a manner that eliminates undue editorial changes. Material must be typewritten with double spacing on one side of paper 8.5" x 11" in size and with 1" to 1.5" margins, and submitted in original and one carbon. All pages should be numbered consecutively.

For all material, except reports of committees, delegates, and officers, the title on the first page should be followed by the author's name without reference to institution of affiliation, title, or degree. Attached to the article should be a separate sheet of paper which indicates the title of the paper, the author, his position, his highest academic degree, the name of the institution from which he attained this degree, and his major field of interest and/or specialization relating to the content of the article.

Reports of officers, delegates, and committee chairman to be submitted for publication should be headed by the official name of the contributor's office, unit, or committee. The Association name is not necessary in such a heading. At the end and on the last page of the report should appear the name of the officer, delegate, or committee chairman. No biographical information is required for individuals submitting such reports.

In all articles, except reports, center sub-headings must be used when appropriate. These should not be numbered. Literature citations should be numbered immediately following references and should be numbered consecutively in order of appearance in manuscript. These numbers should be full-sized Arabic numerals enclosed in parentheses. Subsequent citations to the same reference should be indicated by the original number assigned. References to footnotes throughout the text should be numbered consecutively by superscript Arabic numerals, but such references in a table should be designated by superscript lower case letters beginning with "a." Literature references should be grouped at the end of the article under the heading "References" and in sequence of appearance in the text. These should be preceded by the appropriate reference numbers in parentheses. The names of all periodicals cited in the list of references must be abbreviated in accordance with abbreviations given by *Chemical Abstracts* in its "List of Periodicals Abstracted." Citations of periodicals and books should follow the form required by the *Scientific Edition, Journal of the American Pharmaceutical Association*. *Webster's New International Dictionary* is used as the authority for spelling and use of terms. *A Manual of Style* (University of Chicago Press) is the authority for form.

Numbers of less than three digits should be written in words. Numbers of three or more digits should be written in Arabic numerals unless occurring at the beginning of a sentence, in which case the numeral should be spelled out. Periods of time should be written in words. Decimal numbers should always appear in figures as well as all numbers expressing per cent.

The following words should be capitalized: the word *committee* when referring to a specific committee, officer's titles and the word *association* when referring to a specific department of a specific school, and terms *college* and *school* when specific ones are meant. The following words should not be capitalized: areas of study, academic and equivalent titles unless they precede directly the individual's name or are in apposition, class names, and course names.

Film titles should be underlined to indicate printing in italics. Abbreviations of organizations where the abbreviation is all capital letters should not have periods nor spacing (Example: AACP, AFPE, but A.Ph.A.).

Well-prepared glossy photographic prints are accepted in a limited number. The budget of the *Journal* allows in each volume a limited number of cuts which are printed at no cost to the authors. If the *Journal* is not able to include an author's cuts because of budgetary limitations, the author or the institution represented may pay for such cuts to be included.

Authors wishing to retain photoengravings of illustrations or original drawings and photographs must indicate this desire when returning proofs. Engravings, drawings, and photographs for which no requests are received will be destroyed after each issue of the *Journal* is published.

Photographs should be submitted in envelopes properly padded to prevent damage. All figures submitted must be referred to in the text of the manuscript and should be numbered consecutively with Arabic numerals, e.g., Fig. 1, Fig. 2, etc. Titles of figures should be typewritten on separate pieces of paper. Figure numbers corresponding to titles should be *lightly* written in one corner on the back of the prints.

The number of tables submitted should be kept to a minimum. They should be constructed to occupy no more than the width of the page, seventy type-characters and spaces for regular type and eighty-five for reduced type.

Committee reports of the Association appearing in the Summer issue will be printed in reduced type. All tables should be referred to in the text of the manuscript at the appropriate point of inclusion, and should be numbered in Roman numerals. The table number and title should be placed in a heading above the table.

The Journal maintains a limited staff; hence, all material not conforming to the above specifications will be returned to authors for correction.

Authors should read galley proofs carefully and compare them with the manuscript. All editorial questions, either in the manuscript or proof, should be carefully answered.

In making changes in galley, authors should bear in mind that changing the length of any line will probably necessitate resetting the remainder of the paragraph. A corresponding condensation or addition can often be made to preserve the original length of the line. Excessive changes in proofs will be charged to the author.

Reprints may be obtained at the prices quoted each author when proofs are delivered. Reprints must be ordered when the galley proofs are returned by the author. If reprints are not ordered at that time, it will be understood that no reprints are desired.

The Editor will be glad to answer any questions authors may have concerning the specifications indicated above.

Roster addition. The Roster of Delegates and Representatives, 57th Annual Meeting, AACP, April 8-10, 1956, appearing in the Summer, 1956, issue of this journal should have included the following: University of Wyoming, D. W. O'Day.

The future progress of pharmacy will depend largely on the success of the colleges of pharmacy in preparing men and women to deliver service on a professional basis rather than on the basis of commercial achievement.

R. A. Kuever, Am. J. Pharm. Ed., 5, 440 (1941)

NEW LITTLE PEOPLE

- • • • •
- Eric Dean Leavitt**—born November 18, 1956, to Mr. and Mrs. Dean E. Leavitt, University of Maryland.
- Jonathan David Clay**—born June 27, 1956, to Dr. and Mrs. Michael Clay, Columbia University.
- Robert Allen Miller**—born July 11, 1956, to Dr. and Mrs. Orville H. Miller, University of Southern California.
- Timothy Hamor**—born July 21, 1956, to Dr. and Mrs. Glenn H. Hamor, University of Southern California.
- Nancy Lynn Young**—born August 7, 1956, to Dr. and Mrs. James G. Young, University of Tennessee.
- Jeremy Eli King**—born December 5, 1956. He became the son of Dr. and Mrs. Theodore O. King, University of Wyoming.

MARRIAGES

- • • • •
- Shirley Lorraine Guth**, daughter of Dr. and Mrs. Earl P. Guth, Ohio State University, to John Richard Ferguson, December 28, 1956.
- Dr. W. Marvin Davis**, University of Oklahoma, to Miss Sandra Smith, November 23, 1956.
- Dr. Fred T. Semeniuk**, Professor of Pharmaceutical Chemistry, University of North Carolina, to Miss Joyce Edwards, December 29, 1956.

STAFF CHANGES

NEW STAFF MEMBERS

- University of Colorado.** Dr. Arnold J. Hennig has been appointed associate professor of pharmacy effective February 1. He received all his degrees from the University of Wisconsin and has had experience in pharmaceutical development with the Upjohn Company.
- University of Maryland.** Dr. John Autian has been appointed assistant professor of pharmacy. He was formerly on the staff at Temple University. Dr. Norman J. Doorenbos has been appointed assistant professor of pharmaceutical chemistry. He was formerly on the research staff of Ansco Division of General Aniline and Film Company. Mr. Leslie C. Costello has been assigned by the College of Arts and Sciences to teach zoology and physiology. Mr. Dean E. Leavitt has been appointed instructor of pharmacy administration.

Medical College of Virginia. Dr. Ronald D. Anderson has been appointed assistant professor of chemistry.

Southern College of Pharmacy. Mr. John Roskos has been appointed assistant professor of pharmacy. He recently received his M.S. degree from the University of Maryland. Mr. R. P. James has been appointed instructor of physics.

Columbia University. Dr. Barry Dashowitz has been appointed assistant professor of pharmacy. He holds the Ph.D. from the University of Florida.

University of Arizona. Dr. Jack Robert Cole has been appointed assistant professor of pharmacy effective in January. He recently completed his Ph.D. work at the University of Minnesota.

University of Mississippi. Miss Alta Ray Gault has been appointed assistant professor of pharmacology.

Ferris Institute. Dr. Lloyd O. Poland has been appointed to the staff. He has owned his own drugstore in Indianapolis since 1953 and was on the staff at Butler University as a full professor for seven years. Dr. Arthur W. Reid has been appointed to the staff. He was formerly associate professor of pharmacy administration at the Detroit Institute of Technology.

University of Wyoming. William D. Hardigan has been appointed supply instructor in pharmacy.

University of Georgia. Mrs. Norma Beacham, Mr. Joel E. Mikell, and Mr. Fred L. Underwood have been appointed instructors of pharmacy. Mrs. Beacham is a graduate of the School of Pharmacy of North Dakota Agricultural College. Mr. Mikell and Mr. Underwood are 1956 graduates of the School of Pharmacy of the University of Georgia.

CHANGES IN STAFF TITLES

Southern College of Pharmacy. Mrs. Martha Z. Zachert has been promoted to assistant professor and librarian. Dr. Douglas Johnson has been promoted to associate professor of pharmacology.

Columbia University. Mr. William Weingold has been promoted from instructor of pharmacy to assistant professor.

Philadelphia College of Pharmacy and Science. Dr. Linwood F. Tice has been promoted from assistant dean to associate dean.

University of Tennessee. Mr. Charles Howard Smith has been promoted from instructor of chemistry to assistant professor.

University of Wyoming. Dr. Jack N. Bone has been promoted from associate professor of pharmacy to professor. Mr. William E. Johnson has been promoted from instructor of pharmacy to assistant professor.

I would merely say that until a profession actually becomes united within itself for the common good of all, that profession is not likely to advance.

Morris Fishbein, Am. J. Pharm. Ed., 5, 467 (1941)

GENERAL NEWS

PCP builds dormitory. Philadelphia College of Pharmacy and Science has started construction of a new dormitory for women. The building will be adjacent to the College, house forty-two women, and cost \$300,000. It will be ready for occupancy by September, 1957.

Israeli visitor. Dr. Joshua Kohlberg, President of the Israeli Pharmaceutical Association, visited the Philadelphia College of Pharmacy and Allied Science on December 13, 1956.

Mrs. Hammond passes. Mrs. Elmer L. Hammond, wife of Dean Hammond of the University of Mississippi School of Pharmacy, passed away November 9, 1956.

Claus to Ferris. Dr. Edward P. Claus, formerly Professor of Pharmacognosy at the University of Pittsburgh, assumed his duties as dean of the Pharmacy Division at Ferris Institute in late January.

Nebraska's Pharmacy Airborne. Dean Joseph B. Burt represented the University of Nebraska on the Pharmacy Airborne tour sponsored by the Nebraska Pharmaceutical Association, September 30-October 1, 1956. A total of five district meetings were held at Lincoln, Norfolk, Alliance, North Platte, and Omaha. Governor Victor E. Anderson was a member of the party and spoke at each of the district meetings.

Retirements at Columbia. Professor Fanchon Hart and Professor Lewis N. Brown retired July 1, 1956, from the staff of Columbia University College of Pharmacy.

Jonsson receives grant. Dr. Sigurdur Jonsson, University of North Carolina, has received a grant of \$500 from the American Cancer Society to support studies in the synthesis of metabolites.

NIH grants. Dr. Jack N. Bone and Dr. Raymond J. Kahl of the University of Wyoming each received National Institute of Health Research Grants for the year 1956-57. The grant of \$2000 to Dr. Bone was made through the National Institute of Allergy and Infectious Diseases for research on the synthesis and bio-testing of metallic surfactants. Dr. Kahl's grant of \$2000 was made through the National Heart Institute for research on the synthesis of pharmacology of β -(3-furyl) alkylamines.

King returns from Belgium. Dr. Theodore O. King of the University of Wyoming returned to his duties as professor of pharmacology in September. During the academic year 1955-56, Dr. King car-

ried on research work at the University of Ghent, Ghent, Belgium, under a Fulbright Research Fellowship.

Sager received grant. Dr. Robert W. Sager of the University of Pittsburgh has been awarded a \$700 grant by Mine Safety Appliances, Inc., of Pittsburgh for a comparative evaluation of protective creams and ointments.

Kansas City loaned equipment. The Civil Defense Administration has loaned the University of Kansas City School of Pharmacy radiological monitoring equipment for the purpose of teaching pharmacy students how to detect the degree of radioactivity in the event of an atomic attack. The loan was made because of the previous establishment of a radioisotope laboratory in the school.

Francke abroad. Dr. Don E. Francke, Assistant Professor of Pharmacy and Chief Pharmacist of the University of Michigan Hospital, recently attended a meeting in Hamburg, Germany, of the Council of the International Pharmaceutical Federation. He was a representative from the Press and Documentation Section of the IPF. The following week Dr. Francke attended the meetings in Paris of the Press and Documentation Section of the IPF in conjunction with the French Pharmaceutical Congress.

Blackburn resigns at Purdue. Dr. Dale W. Blackburn resigned from the staff of the School of Pharmacy, Purdue University to accept a position with the Smith, Kline & French Laboratories.

German visitors. Dr. Hilmar Wilmanns, Franz J. Geks, and Ewald Kipper of the Asta-Werke A-G, Chemische Fabrik, Brachwede (Westf.), Germany, were recent visitors at the School of Pharmacy, Purdue University.

Smith becomes President. Dr. R. Blackwell Smith, Jr., formerly Dean of the School of Pharmacy, was officially inaugurated as President of the Medical College of Virginia on December 17, 1956. Dr. Smith, who is a graduate of the MCV School of Pharmacy, took his office as President of the College on July 1, 1956.

New facilities for Maryland. There is at present under construction a new building on the Baltimore campus of the University of Maryland to permit a more convenient organization and operation of the Departments of Pharmacy, Pharmacognosy, Pharmacology, Pharmacy Administration, and Zoology and Physiology, together with administrative offices of the School of

Pharmacy. It is anticipated that the new building will be ready for operation by the September term of 1957.

Australian visits. Mr. Frank H. Bedford of Melbourne, Australia, has a twelve-month scholarship sponsored by Warner-Chilcott, Inc., for the purpose of visiting several colleges of pharmacy in America to gather data to be used to establish a course in pharmacy administration at the Melbourne College of Pharmacy. Mr. Bedford has spent three months at the College of Pharmacy, Ohio State University, and is currently at the Philadelphia College of Pharmacy and Science. Mr. Bedford, in addition to teaching at the Melbourne College of Pharmacy, conducts a retail pharmacy in the Melbourne suburban area.

Wakeman scholarship fund. A "Living Memorial" scholarship fund in honor of a woman who gave thirty-five years of her life to the teaching of pharmacy at the University of Wisconsin was accepted by the University of Wisconsin Board of Regents recently.

The regents accepted a bequest from the estate of the late M. Lydia Wakeman, Madison, who died last September, providing for the establishment of the Nellie Wakeman Scholarship Fund at the University. The income from the fund is to be used for scholarships in the UW School of Pharmacy.

The fund is expected to total about \$22,000 when it comes to the University after settlement of the total estate.

Nellie Wakeman, sister of M. Lydia Wakeman, started her long pharmacy teaching career at the University in 1913, retiring as assistant professor of pharmacy in 1948. She died March 23, 1952.

Nellie Wakeman received her bachelor of science degree from the University in 1908, and her master of science degree in 1910. She served as UW assistant in pharmacy in 1910-11, and as professor of chemistry at Mills College in California in 1911-13. She returned to Wisconsin to complete her graduate work in pharmacy and received her Ph.D. degree in 1913.

1956 Meeting of the Plant Science Seminar. The St. Louis College of Pharmacy and Allied Sciences was host to the 33rd Annual Plant Science Seminar from August 20th to 24th. Dr. Frank L. Mercer was local chairman.

Scientific papers presented to the Seminar dealt with palisade numbers as a means of identifying and determining peppermint and spearmint, by H. I. Silverman and M. S. Dunn; glycosides of *Baccharis glomeruliflora* by S. D. Fuert and W. H. Duncan; hourly study of allergenic pollens, by N. R. Farnsworth, M. Sherman and E. P. Claus; plants working overtime, by E. Ramstad; production of C-14 labeled ergot alkaloids, by A. G. Paul and A. E. Schwarting.

Discussion of the planning and maintenance of a medicinal plant garden was led by H. W. Youngken, Sr. Several aspects of teaching pharmacognosy were presented by A. H. Koffler, F. H. Eby, H. E. Bailey, N. M. Ferguson, and C. H. Johnson. Round table discussion of manpower problems in pharmacognosy was led by F. L. Mercer.

Committee reports dealing with recent progress in pharmacognosy were prepared for the Seminar by A. H. Koffler, F. L. Mercer, E. Ramstad, and V. H. Simonian.

Tours and field trips included visits to the Missouri Botanical Garden in St. Louis and the arboretum at Gray Summit, Missouri, the Jewel Box Conservatory and St. Louis Zoo in Forest Park.

Dr. H. W. Youngken, Sr., made the Edwin Leigh Newcomb Memorial Awards at the annual banquet. The undergraduate student award was given to Mrs. Fenna F. Bonsignore of the University of Connecticut; the graduate student award went to Sunil C. Datta of the Philadelphia College of Pharmacy and Science; the teacher or researcher award was won by Stephen K. Sim of the University of Washington.

New officers elected for 1956-57 were: Chairman, Dr. Harold Bailey, Wayne University; 1st Vice-chairman, Dr. Arthur Schwarting, University of Connecticut; 2nd Vice-chairman, Edson F. Woodward, S. B. Penick Company; Secretary-Treasurer, Dr. Frank L. Mercer, St. Louis College of Pharmacy and Allied Sciences.

Pharmacy enrollment. A report prepared by Louis C. Zopf, Chairman of the Executive Committee, AACP, shows that the colleges of pharmacy in the continental United States show an increase in total enrollment in 1956, which is the largest enrollment recorded since September of 1951. The report covers registration during the first semester, quarter, or term of 1956-57 in all schools and colleges of pharmacy in the United States, including the reports from the University of the Philippines and the University of Puerto Rico. The tabulation of undergraduate enrollment is given for each school and college in the continental United States but does not include the University of the Philippines or the University of Puerto Rico, both of which are listed separately. The grand total includes the enrollment in the seventy-four member colleges in the continental United States, one non-member college, and the enrollment of the University of the Philippines and the University of Puerto Rico.

The reports show the total of 5297 new students were admitted to colleges of pharmacy in the continental United States, of which 2320 or 43.8% were listed as having had some previous college training. The total freshmen enrollment of 4045 represents a slight reduction in the number of

students so classified. It must be remembered, however, that thirteen of our member schools no longer list students in this classification. This year's total represents a gain of 1.6% over last year's total enrollment.

According to the information furnished to Chairman Zopf's office, fourteen United States colleges and two colleges outside the United States are currently offering courses of more than four years, either as a minimum course or on an optional

basis. Schools offering courses longer than four years include: University of Arizona, University of Arkansas, University of Florida, Idaho State College, Loyola University, University of Minnesota, Montana State University, Ohio State University, Oregon State College, Texas Southern University, State College of Washington.

A comparison of the enrollment data based on the enrollment in the continental United States for the current and preceding five years follows:

	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57
Freshman	3,823	3,775	3,866	4,183	4,327	4,045
Sophomores	4,863	4,275	4,112	4,434	4,820	4,906
Juniors	4,437	4,202	3,748	3,609	3,865	4,112
Seniors	4,491	4,316	4,024	3,540	3,533	3,773
Total	17,669(a)	16,639(b)	15,799(c)	15,782(d)	16,658(e)	16,927(f)
Graduate	514	596	570	612	602	655
a. Includes 55 special students b. Includes 71 special students c. Includes 49 special students d. Includes 16 special students e. Includes 113 special students f. Includes 91 special students						

Hospital pharmacy survey. A study designed to determine how pharmacy service is being provided to patients in the nation's hospitals is now under way. Hospital pharmacists themselves have shown the growing problems in providing a total pharmacy service and have pointed out the need for a study of this type. This need is the result of not only increased utilization of hospital facilities but also the continuing increase in the number and extent of use of drugs over the past decade. These factors alone have had a tremendous effect on the handling of drugs for hospital patients.

This is the first comprehensive, national study of pharmaceutical service in hospitals undertaken in the United States. It is being carried out under a grant from the U.S. Public Health Service by the Division of Hospital Pharmacy of the American Pharmaceutical Association and the American Society of Hospital Pharmacists. Members of the Society and the forty-five affiliated chapters throughout the country will be called on for cooperation and full support. The study also has the endorsement of national hospital associations.

This study is being carried out to obtain useful data, such as the type of services and functions available and the facilities, space and personnel needed to perform these activities in hospitals of various sizes and types.

To obtain this information and fulfill the objectives of the study, the investigators will (1) examine present methods of pharmaceutical practice and service in hospitals; (2) outline the elements of pharmaceutical service which will promote better patient care; (3) determine how these elements of service may be more effectively performed for the benefit of the patient, the medical and allied staffs, and the hospital; (4) consider the education and

training desirable for hospital pharmacists to enable them to perform these elements of service; and (5) recommend a plan of action for the implementation of the findings of the Survey.

The collection of data on hospital pharmacy practice will involve the use of mail questionnaires, personal interviews, and case studies. The scientifically selected sample comprises 2,500 hospitals, subdivided according to size and type of service. This method will provide statistical data for these different sizes and types of hospitals, as well as for all hospitals in general.

The need for improving the quality and expanding the scope of pharmaceutical service in the nation's small hospitals is being given particular attention. The fact that this group makes up more than half of the hospitals in the United States points up the importance of studying the particular problems facing the small hospital regarding pharmacy service.

Successful completion of the Survey of Pharmaceutical Service in Hospitals will provide factual data which will serve as a basis for improving the quality and expanding the scope of pharmaceutical service to patients. It will also help to establish standards of procedure in keeping with modern hospital practice and enable better economic planning in the integration of pharmaceutical service with hospital administration and professional services in general.

The Survey is being carried out under the direction of Dr. Don E. Francke, Chief Pharmacist at University Hospital, Ann Arbor, Michigan, in cooperation with the Survey Research Center at the University of Michigan. Mr. Clifton J. Latiolais, formerly Chief Pharmacist at Strong Memorial Hospital in Rochester, New York, is Assistant Program Director.

BOOK REVIEWS

Starling's Principles of Human Physiology, C. Lovatt Evans, Editor. Twelfth Edition. Lea & Febiger, Philadelphia 6, Pennsylvania, 1956. xiii+1233 pp., 721 illus. \$12.50.

This is the eighth revision conducted by Dr. Evans of the classic work in physiology originated by Starling. The format is the same as in the last edition, and no major change is undertaken. The text is brought up to date with additions that are skillfully blended into the general context. Some of the older information and supplemental data are carefully pruned out so that this book is only twenty-three pages larger than the last edition. Many of the older illustrations are deleted, and forty-one new figures are presented. A few of the formula boxes are revised, and several new ones are added. It is noticed that an effort is made to change some of the information in very fine print to the average print used in the text. These changes are most notable in the chapters on the muscles, blood, autonomic nervous system, vision and endocrine organs.

A comprehensive and accurate picture is presented of the basic aspects of the subject, and discussions from the clinical point of view are limited to matters of interest to the student. While much space is devoted to a review of biophysical and biochemical principles, to aid the elementary reader, the average pharmacy student will require a concurrent course in biochemistry which is closely coordinated with this text in order to fully appreciate the book. Details on apparatus and methods used in the physiological tests are presented on an advanced level. Spelling and terminology used are slightly different from those used in the United States, but this should not present any problems.

The book is intended for medical students and students majoring in physiology. Although pharmacy students should not have too much difficulty reading most of the book, the biochemical and biophysical aspects of the sections dealing with the muscle, blood, circulation, and metabolism are advanced for the average pharmacy student who will be taking his course in physiology in the sophomore year. Nevertheless, it should prove to be a valuable reference book in the pharmacy library for those interested in carefully compiled physiological data and details on physiological methods. It is the hope of the reviewer that in the near future, with slight changes in the pharmaceutical curriculum to provide proper background, the pharmacy student will attain the higher

level of physiological knowledge as presented in this textbook.

O. James Inashima
New England College of Pharmacy

The Quantitative Analysis of Drugs, D. C. Garratt. Second Edition. Philosophical Library, Inc., New York 16, New York, 1955. xv+670 pp., 6 figs., 55 tpls. \$17.50.

This book is described by the author, who is chief analyst for Boots Pure Drug Company, Ltd., as the second edition of a book published in 1937 under the title *Drugs and Galenicals; Their Quantitative Analysis*. It is primarily a compilation of critically selected methods of analysis for drugs and pharmaceuticals with the notes, hints, and observations pertaining thereto which the author has accumulated during a period of some thirty-five years of activity in the field of analytical pharmaceutical chemistry.

An alphabetically arranged series of monographs, usually giving the method of the *British Pharmacopoeia* or *British Pharmaceutical Codex* and frequently one or more alternative methods recommended by the author, and discussing methods for the quantitative determination of the substance, its salts, and preparations, constitutes the major portion of the book. This is followed by chapters on oils, fats and waxes, essential oils, and physical methods. Finally, there is a series of appendices consisting of brief comments and observations on various general methods. A supplement was added at the time of printing which correlates the standards quoted in the text to the 1954 edition of the *Codex*. The relatively few references to methods or standards of the *United States Pharmacopoeia* or *National Formulary* refer to the fourteenth and ninth editions, respectively.

In the opinion of the reviewer, this book is a valuable addition to the literature of analytical pharmaceutical chemistry. The carefully selected bibliography and the complete index enhance its usefulness. While teachers in this country would probably not wish to use it as a text, it is an excellent reference work for both students and more experienced workers in the field and deserves inclusion in pharmacy libraries.

A book of similar scope is *The Analysis of Drugs and Chemicals* by Norman Evers and Wilfred Smith. This, too, is the second (1955) edition of a book originally published in 1929. Both of these books contain rather limited discussions of physical methods; the much more extensive comments on the strictly chemical methods given by Gar-

ratt impress the reviewer as being more helpful than the mere quotation of the official method, to which Evers and Smith frequently resort. The latter, however, include a chapter on the use of statistics in chemical analysis which might prove helpful to many workers.

Lee Worrell
University of Michigan

Meditations on Medicine and Medical Education: Past and Present. I. Snapper. Grune and Stratton, New York-London, 1956. vi+138 pp. \$3.75.

This small volume conforms to its title only in a limited sense. It springs from two main strands of the author's life and thought. In his native land, the Netherlands, he first established himself as an eminent clinician and teacher. It is in terms of the New Netherland of his adopted country that he relates the beginnings of American medicine; and it is in terms of Boerhaave's influence that he views its maturity.

Moreover, the basic Hippocratic principles espoused by the great Dutch predecessor of Dr. Snapper clearly inspires and shapes his outlook upon modern medicine. He looks askance at the "ill-conceived dogma of a schism separating bedside medicine and research." That issue, specifically, has stimulated the author's "Meditations . . ." which are enriched by long and international clinical experience and by historical perspective. This brings him to speak out, in the last of three essays, for the values of empirical medicine in the best sense and for maintaining the balance and emphasis of medical teaching along "Neo-Boerhaavian" lines.

The first two essays, comprising two thirds of the book (90 pp.), suffer by comparison. They are loosely knit, sometimes digressive, historical accounts. They are documented in an unorthodox and not always reliable way, mainly by secondary sources.

"Physicians and Surgeons in New Netherland Under the Dutch" opens with a thirteen-page account of the settlement and problems of the colony, then discusses the "Zieckentroosters" and midwives, the academically educated physicians (three biographical sketches), surgical practice, and some medical books and medicaments.

The second essay bears the title, "The Influence of Boerhaave of Leyden on Medicine in the U.S.A." Probably because this influence is largely indirect and difficult to assess, the essay has a wider frame than one might expect, ranging as far back as ancient Greece and examining at some length Boerhaave himself and his Leyden school.

These essays, however appealing from a particular point of view, hardly would find a place in most pharmaceutical libraries.

Glenn Sonnedeker
University of Wisconsin

The Condensed Chemical Dictionary, Arthur and Elizabeth Rose, Editors. Fifth Edition. Reinhold Publishing Corporation, New York, New York, 1956. xix +1201 pp. \$12.50.

In spite of a formidable 30,000 entries, as advertised by the publisher, the book remains manageable in size. The pages are double columned, and the type is quite readable.

The introductory portion of the book contains a numerical arrangement of manufacturers with their addresses, and these numbers are throughout the body of the dictionary to indicate where the various described materials may be obtained. Then follows an alphabetical listing of these same manufacturers with their individual numbers, thus providing the numerical designation of those manufacturers whose name only is known.

Information concerning transportation of explosives and other dangerous chemicals is also included in the introduction, and for convenience these materials are divided into six classes according to the regulations of the Interstate Commerce Commission and the Bureau of Explosives. These categories are used to describe the shipping requirements of some items.

The entries in the body of the dictionary are arranged in a straight alphabetical sequence and include a great many trade names. The information given about most items concerns synonyms, description, physical properties, containers, grades, uses, and shipping requirements.

The actual amount and detail of the information varies from item to item. In some cases it provides little more than a physical description and the manufacturer's number. In other instances, usually well-known chemicals, a great deal of specific information is supplied.

The number of trade-marked products described makes this dictionary a desirable supplement to a pharmacy school library. It would also be quite useful to a person in manufacturing who might be interested in a particular chemical as well as a source from which it could be obtained.

However, in the reviewer's opinion, this book would be of limited use to pharmacists or pharmacy teachers for two reasons. Practically all the therapeutic items from "absinthin" to "zinc undecylenate" are used in "medicine." Thus no actual use or therapeutic action is ascribed to the various entries. Further, the material is not uniformly cross indexed. Though "Histadyl," "Methapyrilene," "Semikon," "Thenylpyramine," and "Thenylene" are generic or trade names for the same compound, it is only found under the first two designations. Under the heading "Histadyl," "Thenylpyramine Hydrochloride" is given as a synonym, while under the heading "Methapyrilene" (sic) no synonym is given.

Considering the size of the book, it is reasonably free of typographical errors.

Joseph A. Bianculi
University of Pittsburgh

Medicinal Chemistry Volume III, F. F. Blicke and R. H. Cox, Editors. John Wiley and Sons, Inc., New York, New York, 1956. 346 pp., 142 tbs. \$10.50.

Medicinal Chemistry Volume III is the third volume in a series of books devoted to reviews in the field of medicinal chemistry. This series was initiated by the Division of Medicinal Chemistry of the American Chemical Society on September 11, 1946.

This volume includes the following chapters: "Methadone and Related Analgesics," by Thomas P. Carney; "Quarternary Ammonium Germicides," by Peter L. de Benneville; "Non-mercurial Diuretics," by Viktor Papesch and Elmer F. Schroeder; and "Synthetic Analogs of Physostigmine," by Arthur Stempel and John A. Aeschlimann.

The chief objective of this volume is to review and compare all of the compounds which have a particular type of pharmacological activity. Tables are used to present the compounds according to chemical groups. There are discussions of the relationships between chemical structure and pharmacological action. References are very complete to all literature including patents. Chapters cover well the methods of synthesis and pharmacological testing procedures.

Chemists, pharmacists, and pharmacologists who are searching for new pharmacologically active molecules will find these volumes a necessity. They are not designed as textbooks, but rather as reference books surveying the present literature.

In the chapter on methadone and related analgesics the influences of R groups are compared in the general formula: $(C_6H_5)_2C(R)COR$.

It utilizes thirty tables and reports from fifty-three references.

Chapter two, on quaternary ammonium germicides, discusses five types of compounds with many derivatives in each. Results are tabulated in sixty-seven tables obtained from 283 references.

"Non-mercurial Diuretics" apparently covers the diuretic compounds very thoroughly. Comparisons are given in twenty-nine tables, and findings in the literature are supported by 241 references.

The survey of Chapter Four covers synthetic analogs of physostigmine. Screening procedures are reported for five areas and on seventeen different types of derivatives. Data collected from 154 references are reported in forty-eight tables.

The text material and formulas have been well proof-read, as the book is practically free of errors. General construction of the book is excellent: the paper is of good quality, the print legible, and the binding strong.

Charles O. Wilson
University of Texas

Fundamentals of Physics and Applications, Howard O. Stearns. Second Edition.

The Macmillan Company, New York, New York, 1956. 384 pp., 303 illus. \$6.50.

This book is a revision of a former edition (1947) by the same author. Although the printing date is 1956, relatively few changes appear in this new printing. Some material has been added in chapter twenty-three on radium and artificial radioactivity, but even this is very briefly presented.

The book briefly treats the main branches of physics in the conventional sequence of mechanics, heat, wave motion and sound, electricity and magnetism, x-rays and atomic phenomena, and light.

The principles of physics are amplified with many fine line drawings, photographs of equipment, and illustrations in the fields of biological science and medicine. At the end of each chapter are many study questions which are quite thought provoking. In fact these features of the book are its main virtues.

The basic concepts in physics are so briefly treated that they take on more of the nature of recipes in a cook book rather than a logical presentation of the subject. Even more serious, some of these ideas are not clearly presented. For example, on page ten the author states that "On the surface of the earth the two (meaning weight and mass) are numerically equal," leaving the impression that they are somehow not too different. Similarly on page thirty-seven the brief explanation which follows Newton's Third Law really gives no amplification of the idea involved. Certainly one would not know that the acting and reacting forces are always on separate bodies. This uncertainty carries over to centrifugal and centripetal forces in the same paragraph. On pages 155 and 166 conflicting explanations are given for binaural hearing. Extreme brevity throughout the book may well be the cause of these and similar inaccuracies, or at least inadequate explanations.

There are a number of places in the book where modern concepts should have been added to indicate the lateness of the edition. On page forty-four the "universal nature of energy" is discussed without any inclusion of nuclear energy. Likewise the law of conservation of energy is mentioned without any intimation that mass and energy are different aspects of the same thing. On page 262 the functioning of Geiger-Muller tubes is hardly discussed in the light of more modern self-quenching devices. There is not too much evidence to indicate that an attempt has been made to bring this book up to date with the more important recent advances in the field.

From this reviewer's point of view it would seem that this book would be a fine reference to have because of its many illustrations in the fields of biological science and medicine, but hardly one to be used in

the classroom as a serious textbook of physics for students in these special fields.

Thomas J. Parmley
University of Utah

Gathercoal and Wirth Pharmacognosy, Edward P. Claus. Third Edition. Lea and Febiger, Philadelphia, Pennsylvania, 1956. 731 pp., 307 illus. \$12.50.

Teachers of pharmacognosy will welcome this book, the first American text employing the biochemical classification of drugs which is comprehensive enough in its scope to render it useful for reference work in both class and laboratory, in addition to serving as a source of lecture material. The system of presentation is logical and easily followed. A general introductory chapter and one discussing methods of classifying crude drugs are followed by chapters devoted to the drugs themselves. These are subdivided into a general presentation of the group, followed by concise monographic consideration of the drugs.

Although the author recognizes that "modern pharmacognosy is built on the significant aspects of cell physiology and biochemistry as they affect the biosynthetic development of the constituents of plants and animals," these important considerations are only scantily presented in the text. The other biological aspects (taxonomy, morphology, histology) of the drugs are in general treated adequately, but unfortunately the chemistry and biochemistry of the constituents receive only minor attention.

If space considerations alone precluded more adequate coverage of these features, it is suggested that the space which could be gained by the omission of a number of extremely minor drugs (Azedarach, Heracleum, Chinquapin Bark, etc.) might be profitable employed.

Errors of fact are infrequent, but do occur. Chromatography is certainly something more than a specialized type of adsorption; vitamin K₂ is not obtained from "purified" fish meal; effectiveness in "small" dilutions is not an outstanding characteristic of the antibiotics.

The volume is copiously illustrated and in many instances contains pictures which add materially to the text. This is particularly true in the section dealing with poliomyelitis vaccine and the excellent chapter on allergens and allergenic preparations. The value of the book in the laboratory is enhanced by retention of the well-known key for the identification of powders.

The method of classification employed, the wide scope of its coverage, the excellent illustrations, and the inclusion of the newer drugs are all features which will render this book invaluable to the student of pharmacognosy. It is at present the only available text incorporating all of these features and as such is certainly worthy of serious

consideration for use as a textbook in undergraduate pharmacognosy courses.

V. E. Tyler, Jr.
University of Nebraska

Thiopentone and other Thiobarbiturates, John W. Dundee, E. and S. Livingstone Ltd., Edinburgh and London, 1956, distributed by the Williams and Wilkins Co., Baltimore, Maryland. vii+312 pp., 59 figs., 51 tpls. \$5.00.

As the title of this book implies, it is a highly specific book on thiobarbiturates. It includes within its covers the history of intravenous anesthesia, detailed information on the synthesis, the physical properties, and the clinical and experimental pharmacology of thiopentone. The appendix of approximately twenty pages includes a section on apparatus for intravenous anesthesia, compatibility of thiopentone with other agents, methods of detection and estimation, and cleaning and sterilization technics for syringes and needles.

The author has performed a commendable task in collating the tremendous amount of investigation in the area of intravenous anesthesia with the thiobarbiturates. Many of the tables and figures are reproduced from leading scientific journals, and the information from these is well presented and organized.

Of particular interest to pharmacists is the section on compatibility of thiopentone with agents such as muscle relaxants, anaesthetics, and vasopressors. For the most part, the book would be more useful to the physician interested in intravenous anesthesia, for whom, as the author points out, it was intended. However, the vast pharmacologic knowledge which has been accumulated on the thiobarbiturates, both animal and human, will be highly informative not only to those engaged in this particular field, but also to those in the general field of central nervous system depressants. The hundreds of references cited are particularly useful.

It is the opinion of the reviewer that this book would be a valuable addition to the research library. It is not particularly suited for libraries primarily geared to the undergraduate level.

Tom S. Miya
University of Nebraska

Neuropharmacology, Harold A. Abramson, Editor. Transactions of the Second Conference. The Josiah Macy, Jr. Foundation, New York, New York, 1956. 328 pp., 85 figs., 26 tpls. \$4.25.

This volume contains the reports and discussions of the Josiah Macy, Jr. Foundation Conference on Neuropharmacology. The five chapters of the book are devoted to several aspects of recent investigations in drugs which produce behavior changes, and their relationship to schizophrenia and its treat-

ment. The chemistry and pharmacology of lysergic acid derivatives is presented by Dr. Aurelio Cerletti. Dr. Stephen L. Sherwood describes the effects of the intraventricular injections of drugs into cats made catatonic by induced lesions in the midbrain, and also a number of drugs introduced through special cannulae into the ventricles of schizophrenic patients. Dr. Humphrey Osmond tells of alterations in his and his associates' behavior produced by inhalation, injection, or consumption of a number of natural products such as epinephrine and related compounds, peyotl, mescaline, and ololiuqui.

Dr. Max Rinkel describes the effects of the administration of LSD-25 to normal persons and a few lobotomized patients, with reproduction of numerous psychotic symptoms. Dr. Harold A. Abramson describes the tolerance to LSD-25, and proposes a theory of the mechanism of this tolerance, which he expands to suggest a mechanism of the cause of schizophrenia.

The reports were given informally with much questioning and discussion during the presentation. The comments and interpretations of this material during the conferences are apparently reported verbatim. Much of the value of the book is derived from this reporting of the exchange of ideas of men in many fields of related study. This method of reporting is also the basis of the chief fault of the volume. It is difficult to follow a train of thought or logical unfolding of a sequence of experiments when extraneous material is so freely injected. It is the intention of the publishers to give all readers a chance to benefit from the group discussions of the conference. In spoken language much is conveyed by voice inflection and even facial expression, all of which, unfortunately, is lost in the printed record, so that it is often difficult to grasp the point of certain comments and questions.

Anyone wishing to get an insight into the over-all picture of research on lysergic acid derivatives, serotonin, adrenochrome, and other hallucinogens or psychosomimetics, and their relationship to psychoses will find this book very valuable. The extensive bibliography will be of value to anyone who would undertake a more thorough study of the methods and scope of this field of study. Dr. Osmond's section on research in schizophrenia is especially readable and interesting to anyone whose interest is at all inclined toward drugs and behavior patterns, and should be of interest to all students in health fields. Dr. Abramson's development of his theory of tolerance will interest those who work with schizophrenia and in related areas, and may offer an approach to the study of tolerance and immunity to other drugs as well.

James M. Crampton
Xavier University

Currents in Biochemical Research, 1956, David E. Green, Editor. Interscience Publishers, Inc., New York 1, New York, 1956. xvi+697 pp., 70 figs., 30 tpls. \$10.00.

This book is a collection of twenty-seven essays on various topics in biochemistry, similar to the well-known original *Currents in Biochemical Research 1946*. This is not a revision, however, but a new book. The topics discussed are those of greatest interest today, and are the following: chemistry and viral growth (Hershey); photosynthesis (Bassham and Calvin); bacterial fermentations (Barker); some aspects of vitamin and growth factor research (Snell); the significance of induced enzyme formation (Spiegelman and Campbell); certain problems in the biochemical study of disease (DeWitt Stetten, Jr.); the hormones, their present significance, their future (Pincus); problems of cellular biochemistry (Cori); enzymes as reagents (Racker); attempts at the formulation of some basic biochemical questions (on mechanism of protein synthesis) (Lipmann); enzyme complexes and complex enzymes (Mahler); relation between prosthetic groups, coenzymes and enzymes (Theorell); enzyme-substrate compounds and electron transfer (Chance); on the nature of hemoprotein reactions (George); aspects of protein structure (Low and Edsall); the structure of insulin (Sanger); ribonucleic acids (Cohn); chemical structure as a guide to the study of biochemical synthesis (Bloch); the role of nucleotides and coenzymes in enzymatic processes (Huennekens); the biosynthesis of porphyrins, the succinate-glycine cycle (Shemin); problems in the study of multiple enzyme systems (Greenberg); enzyme kinetics (Alberty); the interconversion of sugars in nature (Leloir); a theory of the primary events in muscle action (Morales and Botts); nerve activity (Nachmansohn and Wilson); blood (Surgenor); and an integrated concept of carcinogenesis (Rusch).

"The essays are intended for the orientation of non-specialists or workers in other fields." In general the book succeeds in doing just this, although some of the articles would be too difficult for the "non-specialist" without extensive background reading; and one or two are too superficial to be of much value. The book is recommended as general reading. The reviewer recommends specially to those with pharmaceutical interests the articles on vitamin and growth factor research by Snell, and Pincus' discussion of the present significance and future of the hormones.

S. Jonsson
University of North Carolina

Steric Effects in Organic Chemistry, Melvin S. Newman, Editor. John Wiley and Sons, Inc., New York, New York, 1956. vii+710 pp., 63 figs., 148 tbls. \$12.50.

The thirteen chapters of this book are written by twelve different authors. The editor has included chapters on conformational analysis, substitution at saturated carbon atoms, aromatic substitution, unsaturated functions, intramolecular rearrangements, olefin forming eliminations, carbon-carbon cleavages, organo-metallic compounds, equilibrated systems, molecular complexes and asymmetry, physical properties, calculation of magnitude of steric effects, and separation of polar, steric and resonance effects.

The numerous figures and tables permit the inclusion of an amazing amount of laboratory data. An author index which lists over 1900 names attests to the thorough documentation of these essays and to the coverage of most of the significant work in this field. A fourteen-page subject index contributes to the usefulness of the book.

The main objective of this volume is to focus attention on the steric aspects of organic chemistry, by presenting enough experimental data in each chapter to give a reader sufficient background to interpret other reactions or phenomena in the same area for himself. The editor also hopes that "by study of this book practicing chemists will be convinced that a proper appreciation for the role of steric factors can be very useful in the laboratory." These objectives are certainly realized in these thirteen essays.

A chapter of particular interest to the reviewer was the one dealing with steric effects on physical properties. The author of this chapter, Lloyd Ingraham, of the U.S. Department of Agriculture, describes effects of steric hindrance on refractive index, molecular refraction, fluorescence, polarographic reduction potential, elasticity, melting point, dipole moment, and several other properties.

This volume should serve as an excellent reference work, source of background material, and introduction into the literature of steric effects for teachers and laboratory workers at all levels of organic and pharmaceutical chemistry. It should be available in all pharmacy libraries.

Gustav E. Cwalina
Purdue University

Cosmetics: Their Principles and Practices, R. G. Harry. First American Edition. Chemical Publishing Company, Inc., New York 10, New York, 1956. xxvi+786 pp., 119 figs., 26+ tbls. \$17.00.

This is the first American edition of an English publication containing a more or less universal survey of the published literature available on the subject of cosmetics, plus the results of many of the author's own investigations. The extent of the cover-

age is indicated by the 786 pages of printed material, which includes seventeen index pages and fifteen pages of appendices with an additional 119 illustrations.

The difficulty of arranging such a profusion of information is handled in a rational manner, resulting in a logical sequence of the material. The first four chapters dealing with the skin are followed by eleven chapters on the care of the skin, three on the care of the mouth, one on the care of the eyes, seven on the care of the hair, nine on the care of the body, five on the care of the hands, and the remaining five on general aspects of cosmetic formulation. The dermatological considerations are followed by discussions concerning the formulation of the preparations involved.

In the preface the author states that "extensive developments in the cosmetic and toilet industry in the past decade have rendered desirable the writing of a completely new work dealing with modern cosmetic discoveries." Had the references been confined to the past decade, perhaps it would not have detracted from the value of the book. Also, had the explanations of some of the involved scientific aspects been omitted it might have been more attractive as a reference for the cosmeticians for whom it was primarily written.

The value of the book as a text has been completely nullified by the author's apparent attempt to prepare an "all inclusive" resumé of the available information on the subject. As a result this is an expensive work containing material enough for several courses. However, its value as a reference book is unquestionable, particularly where a separate course in cosmetics is offered or when the study of cosmetics makes up a portion of the course in manufacturing pharmacy. Also, it can be used in dispensing pharmacy when dermatological prescriptions are a part of the material for consideration. Certainly this edition can be recommended as a valuable addition to any pharmacy library.

The reviewer is not aware of any other attempt on the part of one author to assemble in one volume such a mass of material on the subject of cosmetics. Mr. Harry is to be complimented on the untiring effort necessarily expended in preparing such a work, and for recognizing the need of the cosmetic industry for the correlation of medical and technical data on the subject.

Jean Brown
University of Oklahoma

Medical and Public Health Laboratory Methods, James Stevens Simmons and Cleon J. Gentzkow. Sixth Edition. Lea & Febiger, Philadelphia, Pennsylvania, 1955. 1191 pp., 124 illus. \$18.50.

Five previous editions of this compendium have appeared since 1918 under the well-known title, *Laboratory Methods of the United States Army*. This sixth edition has been given a distinctive title which immed-

iately suggests several questions. Are medical and public health laboratory methods essentially one and the same, or are they quite distinct? Basically, are there differences between the so-called "clinical" laboratories and those associated with public health agencies? Granting that there are few if any differences in the methodology used by these various laboratories, are there still radically different administrative practices involved? Answers to such questions might have served as an intriguing introduction for laboratory workers themselves and for others, such as pharmacists, who need to understand the role of these laboratories in our complex society.

Perhaps there is not room for such a philosophical introduction in a book which has already grown from a small pocket manual to encyclopedic proportions. Now it consists of fifty-two chapters, arranged in eleven sections covering: clinical pathology, chemistry, mycology, bacteriology, rickettsiae and filterable viruses, protozoology, helminthology, entomology, pathology, special veterinary methods, and statistical methods.

The present edition has been enlarged by 368 pages over its predecessor and includes many new and revised subjects: kidney and liver function tests, blood groups and their determination, blood transfusion and blood bank practice, quantitative and special urinalyses, chemical examination of the blood, fluorometry, flame photometry, paper chromatography, bacteriological examination of water and sewage, new method for true reducing sugars in blood and urine, new and previously unpublished rapid turbidimetric method for determining amylase of serum, new methods for isolation and identification of poisons in insecticides and rodenticides, a new chapter on antibiotics, and a section on mycology expanded from three to seven chapters.

The pharmacist may not often use many of these tests himself, yet he will have to refer to some of them frequently. Inasmuch as this compilation has long been recognized as a standard work, the revised edition should be among the reference books of every professional, including pharmacists. Without doubt, this text will continue over the years to serve as a tribute to its many contributors, particularly the former Chief of Preventive Medical Services in the Office of the Surgeon General of the U.S. Army, and Dean of the Harvard School of Public Health—the late James Stevens Simmons.

William W. Stiles
University of California

Chemistry and Uses of Pesticides, E. R. de Ong. Second Edition. Reinhold Publishing Co., New York, New York, 1956. vii+334 pp., 18 figs., 19 tpls. \$8.75.

The title of the book has been changed from "Insecticides" to "Pesticides" since the latter term has become the official name for

all chemicals used as pest control agents including insecticides, repellents, fungicides, seed protectants, herbicides, and rodenticides.

The general plan of this edition is the same as that of the previous edition, the entire text, however, having been rewritten and brought up to date. Chapters cover: arsenical compounds; copper compounds, sulfur and its compounds, miscellaneous inorganic compounds, petroleum and its products; fumigants and fumigation; plant derivatives; synthetic organic insecticides and fungicides, repellents, seed protectants; organic herbicides and rodenticides (new to this edition); cold, heat, dehydration, and radiation as pesticides. References to important literature are included in each chapter.

The introduction includes three new interesting tables contrasting records of accidental deaths in the United States over certain years from various pesticides and from drugs such as barbiturates, aspirin, lye, and alcohol.

Chemical and physical data, toxicology, compatibility, formulations, dosage, and use and time of application of many pesticidal materials are given, including the most recent advances in research. Almost half the book is devoted to the use of synthetic organic compounds, many not previously listed.

The appendix includes (a) a valuable dictionary of 500 compounds showing the chemical and common names with concisely stated uses, (b) a glossary defining twenty-three terms (this section could be enlarged upon), (c) a section on tolerances for pesticide residues in or on fresh fruits and vegetables, as well as those requiring a zero tolerance and those exempt from the requirement of a tolerance, and (d) a section on recommended antidotes for poisons quoted from the official antidotes prescribed by the California State Board of Pharmacy.

For the general reader there are guides in the index to what may seem a bewildering mass of names. For example, under the subject headings of "wood preservatives," "weed killers," and "industrial fungicides" are grouped the names of chemicals suitable for such purposes.

The book will be of value to the college instructors of agricultural chemistry, pesticide manufacturers, research workers, food processors, farmers and students. It should be included in all pharmacy school libraries as a reference book for courses in economic pharmacognosy (pesticides).

Albert H. Musick
University of Tennessee

Synthetic Ion-Exchangers, G. H. Osborn. The Macmillan Company, New York, New York, 1956. ix+194 pp., 4 figs., 11 tpls. \$6.00.

The field of ion-exchange resins is an important one which, in recent years, has been assuming growing importance. *Synthetic Ion-Exchangers* treats recent developments

in the theory and application of these substances in the following chapters: "The Structure, Preparation and General Properties of Ion-Exchange Resins," "Performance Data on Commercially Available Resins," "Analytical Aspects," "Reaction with Materials of Low Solubility," "Ion-exclusion," "Ion-exchange Membranes," and "Therapeutic Applications." These seven chapters discuss the types of resins available and techniques proposed for the use of these resins.

In addition, the book includes a 102-page classified bibliography, divided into two parts: applications and theoretical.

The reviewer believes this publication should be valuable to persons wishing to survey the field of synthetic ion-exchangers and become more familiar with current aspects of this important subject. Its inclusion in pharmacy libraries is recommended.

Charles Schwartz
Southwestern State College

Principles of Renal Physiology, Homer W. Smith. First Edition. Oxford University Press, New York, New York, 1956. x+237 pp., 24 figs., 3 tpls. \$5.00.

This small volume represents an excellent condensation of the salient points covered in the author's comprehensive treatise on renal physiology, *The Kidney, Structure and Function in Health and Disease* (Oxford University Press, New York, 1951). The essentials of the latter reference work are thus made available as a text for the student and others seeking an introduction to the intricacies of the function of the kidney.

A survey of the essential features of the anatomy of the kidney and a review of the history of the development of modern concepts of renal function are followed by sections devoted to the measurement of glomerular filtration rate, to reabsorptive and excretory activities of the renal tubules and to the excretion of urea and protein. Most of the latter half of the book is concerned with the regulation of the volume and composition of body fluid compartments, with sections on strong electrolytes, water diuresis and antidiuresis, the integration of sodium and water excretion, and various aspects of acid-base balance. A final section deals with the control of the renal circulation. Most of the sections are concluded with problems which give the reader, who may be so inclined, an occasion to think further about the material presented and to go through some of the arithmetical manipulations involved in planning and interpreting clearance studies. A series of appendices, consist of two major and several minor divisions. The two major items, one on the electron microscopy of the kidney and one on methods and technics used in renal clearance studies, seem a little out of place in an elementary text of this sort. An excellent bibliography of selected readings related to each section completes the volume.

In general, the material for inclusion has been very well selected and is presented in the clear and logical style one has learned to expect of the author. In a text intended primarily for students, it is often desirable to avoid presentation of too many possible interpretations of a phenomenon, and in several instances here considerable controversy has been swept under the rug. However, in most of these instances the position adopted by the author, if not supported by unassailable evidence, is at least as tenable as any other. Dr. Smith's classic on renal function (*Physiology of the Kidney*, 1937), although still fascinating reading, has been outdated through the accumulation of much new information and shifts of interest. The present work will fill the need created by the obsolescence of the earlier volume.

Robert W. Berliner
National Heart Institute

Pharmacognosy, Robertson Pratt and Herbert W. Youngken, Jr. Second Edition. J. B. Lippincott Company, Philadelphia, Pennsylvania, 1956. xii+694 pp., 67 figs., 45 tpls. \$10.00.

Five years have elapsed since the first edition of Pratt and Youngken made available to teachers and students of pharmacognosy a modern American textbook of pharmacognosy written in textbook style, and departing from the traditional taxonomic classification of natural drugs. Adoption of the first edition as a textbook in a relatively large number of our colleges of pharmacy is convincing evidence that the teachers at least were eager for a change from the taxonomic-morphologic approach to pharmacognosy. There appears to be some evidence that students also do not object to a change of emphasis.

Release of the second edition of the book in 1956 came within months of publication of Ferguson's *A Textbook of Pharmacognosy* and of the extensive and careful revision and rearrangement of Gathercoal and Wirth by Claus. All three books place greater emphasis on biochemical data and less on taxonomy and morphology, but Pratt and Youngken have included more explanatory material of a general nature than have the other authors.

As in the first edition of *Pharmacognosy*, the basis of classification is therapeutic use. The authors persist in calling this classification physiologic, which appears to me to be a misuse of the term physiologic. Reference is made to the "physiologic properties of the drugs," to a drug's "dominant physiologic effect," and to "their physiologic or pharmacodynamic activity." The last-named term, although not a popular one, does, of course, refer to drug activity. But physiologic properties, effect, and activity are not possessed by drugs. The action of hormones in replacement therapy might be thought of as physiologic, but even here the term thera-

peutic (or if preferred, pharmacodynamic or pharmacologic) appears to me to be preferable. Therapeutic is a perfectly good term, so why not use it?

Many of the trivial but annoying errors of the first edition (such as listing a drug NF when it was USP, or listing a synonym as the primary name) have been corrected. The frequent lists headed "Typical Preparations" include the crude or the processed drug along with such pharmaceutical preparations as tablets and injections. Ordinarily such drugs as digitalis, aloe, and sodium penicillin G are not considered preparations. Several tables of synthetic drugs, anthelmintics, antimalarial drugs, antihistaminics, and others do not appear to serve any very useful purpose in a textbook devoted to natural products.

This book includes descriptions and discussions of most of the important natural drugs, and will doubtless continue to be widely used as a textbook. The second edition discusses a number of relatively new drugs, and is an improvement over the first edition in organization of subject matter. I believe the greatest contribution of the book, however, lies in the impetus it has given and will continue to give to presentation of pharmacognosy as a dynamic applied science rather than as a static body of desiccated facts.

Richard A. Deno
University of Michigan

Clinical Toxicology, Clinton T. Thienes and Thomas J. Haley. Third Edition. Lea & Febiger, Philadelphia, Pennsylvania, 1955. xvi+441, 16 figs., 33 tbls. \$6.50.

Clinical Toxicology has been extensively revised to include the toxicology and treatment of poisoning from the newer insecticides, ganglionic blocking agents, cortisone, and many other new agents that have been recently introduced. As in the older editions, the first sections (I-VI) of the book classify chemical agents according to a predominant action on specific organ systems. Since many poisons produce toxic effects on more than one organ, repetition is inevitable. This does not decrease the value of the book since the index is complete. When more than one page reference is given in the index, the principal reference is indicated in bold-faced type. The sections on poisons are subdivided into several chapters. Each chapter describes the effects of chemical agents that may, for convenience, be grouped together.

Each drug, or group of drugs having similar action, is discussed under the following headings: toxic dose range, source, absorption, etiology of poisoning, symptoms, duration, fate and excretion, pathology, diagnosis, and treatment. The treatment described, although brief, is adequate, and conforms to the current, generally accepted methods. All the chemical agents that are

commonly encountered as well as many that rarely are a cause of poisoning are described.

Section VII is concerned with principles of treatment. The chapter headings in this section are: "Measures to Decrease Absorption," "Elimination of Unabsorbed Poison," "Physiological Antagonism of Poisons," and "General Care." Section VIII presents "An Outline of Symptom Diagnosis" and should be of value in aiding the physician to decide the nature of the poison taken or to narrow the possibilities to a small group of agents. Chemical tests for poisons are presented in Section IX. The authors have assembled the latest and most specific tests that have been described. For many chemical agents, two or more chemical tests are described, and in some cases, a biological test as well. The preparation of the reagents required for chemical testing is described in the appendix.

A few minor errors were noted, such as the statement that atropine depresses cholinergic nerve endings. The generally accepted explanation of the action of atropine is that it combines with the receptors of cells enervated by postganglionic cholinergic nerve fibers and thus prevents the action of acetylcholine.

I find *Clinical Toxicology* less cumbersome to use than von Oettingen's *Poisoning* which has an alphabetical listing of chemical agents. Also the sections on treatment are less complete and up-to-date in the latter book.

Clinical Toxicology should be of value to physicians and as a text for students in pharmacology, and pharmacy, as well as for anyone interested in toxicology.

Carroll A. Handley
Baylor University

Commercial Waxes, H. Bennett, Editor. Second Edition. Chemical Publishing Co., Inc., New York, New York, 1956. 688 pp. \$15.00.

Mr. Bennett's second edition of *Commercial Waxes* has advanced only slightly toward that ideal, the perfect but probably never to be written, compendium on wax technology.

The first edition of *Commercial Waxes*, published in 1944, was at the time one of the very few books available on wax technology and, therefore, had a certain value. The forward strides in all phases of science and technology should, after twelve years, have brought about some striking changes also in a new volume of the available information on waxes and their commercial applications. In the second edition of *Commercial Waxes*, described on the title page as being completely revised and enlarged, fully 90 per cent of the material is identical to that published in 1944.

The major changes in the new edition have been a fuller development of the text on the use of wax in paperboard, textiles,

rubless polishes, and silicone-wax polishes, and the expansion of the section on the all-important subject of candles from eight pages to thirteen pages. The format has been improved, and the printing is clear and sharp with almost complete freedom from printing errors. In an effort to reduce the complexity of the subject matter, the book is divided in five broad categories, *i.e.*, natural waxes, manufactured and synthetic waxes, physical properties of wax compositions, wax technology, and waxes in industry. In addition there is an appended glossary, a section of special tables, a list of substitutes for specific waxes, and an extensive formulary.

There are several shortcomings that cannot be passed over without comment. In selecting material for the second edition, it appears that somewhat stricter editorial judgment could have been exercised both in evaluating some of the older data retained from the first edition and the newer information introduced for the first time in the second edition. As an example of older information that is in need of revision, a statement such as that on page forty-four, "The melting point of paraffin wax is dependent on the oil content," certainly should be deleted in the light of present knowledge of the effect on the melting point of paraffins of the iso- and cycloalkane components. Another glaring technical error is the declaration that "carnauba does not form strong gels in naphtha" (page 311), when throughout the polish industry it is used extensively for the strength of its naphtha gels. It seems inappropriate also that in a treatise on commercial waxes that materials such as cotton wax, flax wax, rice oil wax, and fir-bark wax are introduced. To the best of this reviewer's knowledge, there is no commercial traffic in these waxes, although samples have been available from time to time. On the other hand, a wax as well known and as available as Fischer-Tropsch hydrocarbon and its modified forms is completely ignored. The tables and constants are always of value to the technical man and the formulator. The formulary itself is, as is true of most formularies, a good point of departure, particularly since the

formulas given are either culled from patent literature and therefore not to be infringed (and Bennett warns on this point), or so old and outmoded that they are only prototypes of present-day formulations.

In spite of the shortcomings noted and a somewhat excessive verbosity in some quoted descriptions, the book has a certain value for those interested in the utilization of wax in commercial preparations and deserves a place on the bookshelf of the wax technologist.

Edward A. Wilder
S. C. Johnson & Sons, Inc.

The Structure and Function of Skin, William Montagna. Academic Press Inc., New York, New York, 1956. xvii+ 356 pp. \$8.80.

This book, written by an anatomist deeply interested in the skin, has as its introductory theme the assumption that structure and function are closely interrelated and must be so considered if we are to understand biologic phenomena. The magnitude of the subject and the difficulties of studying the skin are well pointed up.

The major portion of the book is a very concentrated resumé of accumulated knowledge of the structure and function of the various parts of the skin, followed by a discussion of some more general theories about the skin. Considering the magnitude of the subject and the abbreviated character of the book, it is well written, reads easily, and is factually accurate.

The book would seem to have its greatest value in the training of dermatologists and for others specifically interested in cutaneous anatomy and physiology. It should serve a valuable purpose as a reference in a pharmacy library, but would be too detailed for classroom use. The detailed yet condensed character of the book necessarily leads to the frequent use of terms which are not defined and will not be understood by those not conversant with anatomical, histological, physiological, and biochemical language. To the teacher of dermatology it is a stimulating volume.

Robert G. Carney
The State University of Iowa

The people who work for the good of all and for the advance of scientific pharmacy are the people who must have the leadership and who in the end will receive the confidence of the profession.

Morris Fishbein, *Am. J. Pharm. Ed.*, 5, 469 (1941)

NEW BOOKS

- Spot Tests**, Fritz Feigl. Elsevier Publishing Company, 1956. 616 pp., 41 tpls., illus. \$10.00.
- Ion Exchange and Its Applications**, Conference Papers, London University. The Macmillan Company, New York 11, New York, 1956. 173 pp., tpls., figs. 8½x11. \$7.50.
- Administrative Medicine**, George S. Stevenson, Editor. Transactions of the Fourth Conference. Josiah Macy, Jr. Foundation, New York, New York, 1956, 251 pp., 11 figs. \$4.25.
- Organic Synthesis, Volume 36**, N. J. Leonard, Editor. John Wiley & Sons, Inc., New York, New York, 1956. 120 pp., illus. \$3.75.
- Organic Chemistry, Volume Two**, I. L. Finar. Longmans, Green and Company, New York, New York, 1956. 733 pp., illus. \$8.50.
- Functions of Autonomic Transmitters**, J. Harold Burn. The Williams & Wilkins Company, Baltimore 2, Maryland, 1956. 228 pp., 37 tpls., 43 figs. \$5.00.
- Organic Chemistry**, Louis F. Fieser and Mary Fieser. Reinhold Publishing Company, New York, New York, 1956. 1112 pp., illus. \$10.00.
- Advanced Organic Chemistry**, E. Earl Royals. Prentice-Hall, Inc., New York 11, New York, 1956. 948 pp., illus. \$12.00.
- The Chemistry and Technology of Waxes**, Albin H. Warth. Second Edition. Reinhold Publishing Company, New York 22, New York, 1956. 940 pp., illus. \$18.00.
- Taber's Cyclopedic Medical Dictionary**, Clarence Wilbur Taber. Seventh Edition. F. A. Davis Company, Philadelphia, Pennsylvania, 1956.
- Physical Chemistry for Students of Pharmacy and Biology**, S. C. Wallwork. Longmans, Green and Company, New York, New York, 1956. 307 pp., illus. \$5.00.
- Traité de Pharmacie Chimique, Volumes One through Five**, P. LeBeau and M. M. Janot, Editors. Fourth Edition. Hafner Publishing Company, New York 3, New York, 1956. 4,978 pp., illus. About \$95.00 for five volumes paper bound. About \$110.00 for five volumes cloth bound.
- Immunology and Serology**, Philip L. Carpenter. W. B. Saunders Company, Philadelphia 5, Pennsylvania, 1956. 351 pp., illus. \$6.50.
- What is Science?** James R. Newman, Editor. Simon and Schuster, New York, New York, 1956. 493 pp. \$4.95.
- Experimental Methods for the Evaluation of Drugs in Various States**, B. N. Craver *et al.* The New York Academy of Sciences, New York 21, New York, 1956. 286 pp., illus. \$4.00 (paper).
- Techniques for the Study of Behavioral Effects of Drugs**, P. B. Dews, *et al.* The New York Academy of Sciences, New York 21, New York, 1956. 114 pp., illus. \$3.00 (paper).
- Natural Resistance to Infections**, Walsh McDermott, *et al.* The New York Academy of Sciences, New York 21, New York, 1956. 176 pp., illus. \$3.50 (paper).
- Ultraviolet and Visible Absorption Spectra, Index for 1930-1954**, Herbert M. Hershenson. Academic Press, Inc., New York 3, New York, 1956. 205 pp. 8½x11. \$12.00.
- Transport and Accumulation in Biological Systems**, E. J. Harris. Academic Press, Inc., New York 3, New York, 1956. 291 pp., 61 illus. \$7.80.
- Proteins and Enzymes**, Archives of Biochemistry and Biophysics, Volume 65, Number 1. Academic Press Inc., New York 3, New York, 1956. 467 pp. illus. \$5.00 (paper).
- Clinical Chemistry**, Joseph S. Annino. Little, Brown and Company, Boston, Massachusetts, 1956. 280 pp. \$7.50.
- Review of Medical Microbiology**, Ernest Jawetz, Joseph L. Melnick, and Edward A. Adelberg. Second Edition. Lange Medical Publications, Los Altos, California, 1956. 360 pp., illus. \$4.50 (paper).
- Some Observations on American Education**, Robert M. Hutchins. Cambridge University Press, New York 22, New York, 1956. 136 pp. \$3.00.
- Scientific Inference**, Harold Jeffreys. Cambridge University Press, New York 22, New York, 1956. 272 pp., 14 figs. \$5.50.
- Phosphorus and Fluorine. The Chemistry and Toxicological Action of Their Organic Compounds**, B. C. Saunders. Cambridge University Press, New York 22, New York, 1956. 240 pp., 30 figs. \$6.00.
- Enzyme, Antigen and Virus: A Study of Macromolecular Pattern in Action**, F. Macfarlane Burnet. Cambridge University Press, New York 22, New York, 1956. 204 pp., 7 figs. \$3.50.
- Peaceful Uses of Atomic Energy**, Proceedings of the International Conference in Geneva, 1955. International Documents Service, Columbia University Press, 2960 Broadway, New York 27, New York, 1956. Vol. 1. (The World's Requirements for Energy: the Role of

Nuclear Power), 544 pp., \$8.00. Vol. 2. (Physics, Research Reactors), 520 pp., \$8.00; Vol. 3 (Power Reactors), 400 pp., \$7.50; Vol. 4 (Cross-Sections Important Reactor Design), 416 pp., \$7.50; Vol. 5 (Physics of Reactor Design), 700 pp., \$9.00; Vol. 6 (Geology of Uranium and Thorium), 736 pp., \$9.00; Vol. 7 (Nuclear Chemistry and the Effects of Irradiation), 776 pp., \$10.00; Vol. 8 (Production Technology of the Materials Used for Nuclear Energy), 768 pp., \$10.00; Vol. 9 (Reactor Technology and Chemical Processing), 864 pp., \$10.00; Vol. 10 (Radioactive Isotopes and Nuclear Radiations in Medicine) 640 pp., \$8.00; Vol. 11 (Biological Effects of Radiation), 480 pp., \$8.00; Vol. 12 (Radioactive Isotopes and Ionizing Radiations in Agriculture, Physiology, and Biochemistry), 704 pp., \$9.00; Vol. 13 (Legal, Administrative, Health and Safety Aspects of Large Scale Use of Nuclear Energy), 400 pp., \$7.00; Vol. 14 (General Aspects of the Use of Radioactive Isotopes: Dosimetry), 312 pp., \$6.50; Vol. 15 (Applications of Radioactive Isotopes and Fission Products in Research and Industry), 400 pp., \$7.50; Vol. 16 (Record of the Conference), 350 pp., \$5.00.

MISCELLANEOUS PUBLICATIONS

Peaceful Uses of Atomic Energy, Report of a Panel. Government Printing Office, Washington 25, D.C., 1956. Vol 1 (Cat.

No. Y4. At 7/2: At 7/13/v.1). 155 pp. \$0.45; Vol. 2 (Cat. No. Y4. At 7/2: At 7/13/v.2), 749 pp., illus., \$2.00 (paper).

Clinical Memoranda on Economic Poisons, Report of the U.S. Technical Development Laboratories of the Technology Branch of the Communicable Disease Center. Government Printing Office, Washington 25, D.C., 1956. (Cat. No. FS 2.60/2:P 75/2) 78 pp., illus., \$0.30 (paper).

Federal Funds for Education, 1954-55 and 1955-56. Government Printing Office, Washington 25, D.C., 1956. (Cat. No. FS 5.3:956/5) 163 pp. \$0.60 (paper).

First Interim Report to the President, The President's Committee on Education Beyond the High School. Copies available from the Committee, Washington 25, D.C., 1956. 12 pp. Free (paper).

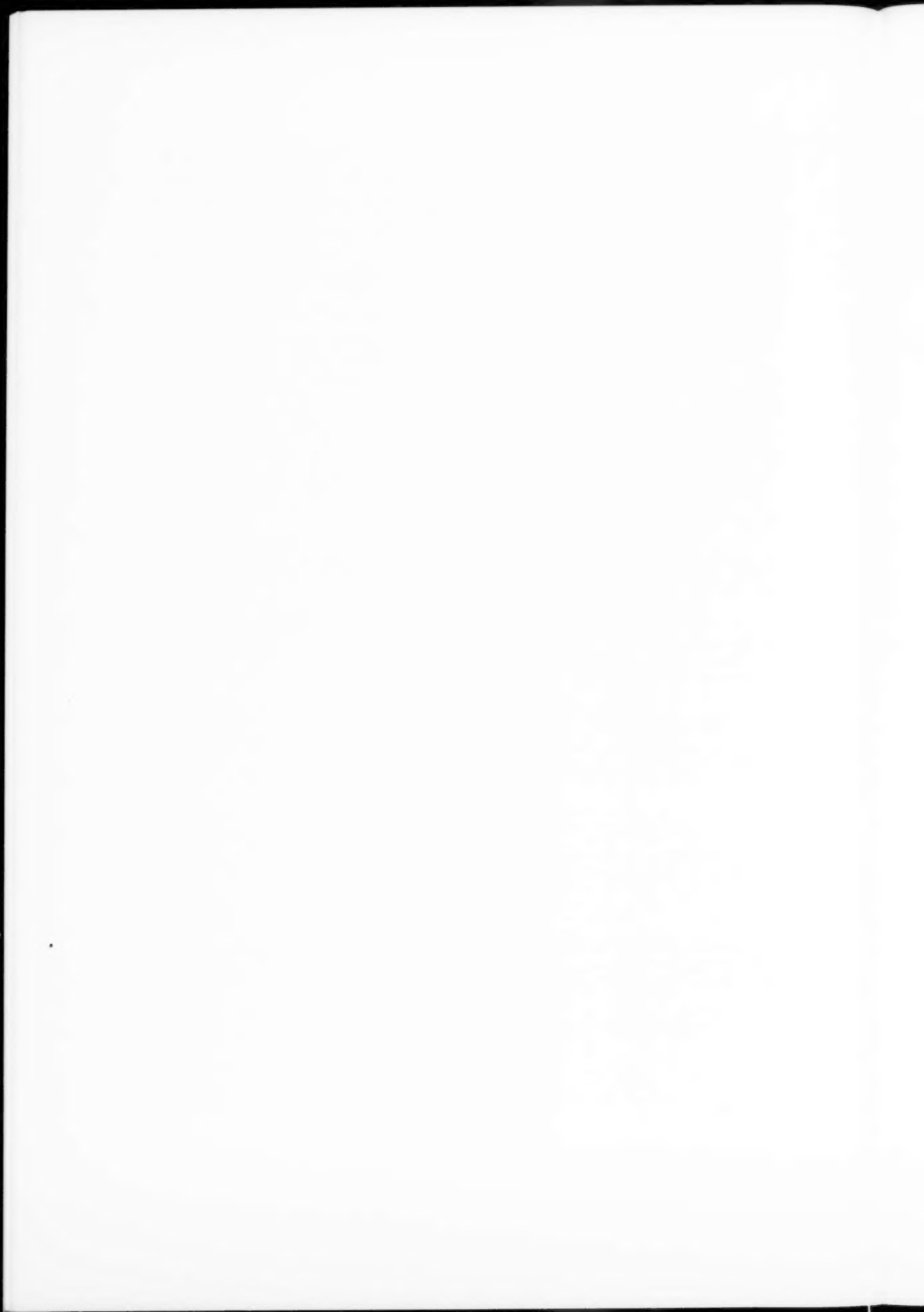
A Call for Action to Meet the Impending Increase in College and University Enrollment, American Council on Education. Copies available from the Council, Washington 25, D.C., 1956. 29 pp. Free (paper).

Proceedings of the Conference on the Myoneural Junction, E. M. Papper and E. J. deBeer, Editors. Burroughs Wellcome & Co., Tuckanoe, New York, 1956. 171 pp., tpls., figs. Free (paper).

Federal Careers, A Directory for College Students, United States Civil Service Commission. Government Printing Office, Washington 25, D.C., 1956. 79 pp., illus. \$0.60.

Pharmaceutical education is as truly a university function as is any other phase of health education, and deserves the same generous financial support from state appropriation that other constituent colleges of the university receive.

R. A. Kuever, *Am. J. Pharm. Ed.*, 5, 441 (1941)



FELLOWSHIPS IN PHARMACY

To meet the demonstrated need for qualified teachers and researchers in the field of pharmacy, the American Foundation for Pharmaceutical Education announces a limited number of fellowships for students seeking graduate degrees in pharmaceutical subjects.

These fellowships are open to students (men or women) qualified for registration in approved graduate schools or colleges for one or more of the following major fields:

PHARMACY
PHARMACEUTICAL CHEMISTRY
PHARMACOLOGY
PHARMACOGNOSY
PHARMACY ADMINISTRATION
(or closely related subjects)

The Foundation offers Teaching Fellowships in Business Administration, in cooperation with colleges of pharmacy. Deans have full information on these awards. Applications must be made jointly by individuals and their colleges.

Pfeiffer Memorial Postdoctoral Research Fellowships are available to college of pharmacy faculty members.

For application forms or further information write to

W. Paul Briggs, Secretary

**AMERICAN FOUNDATION FOR
PHARMACEUTICAL EDUCATION**

1507 M Street, N.W.

Washington 5, D.C.